THE IRON AGE

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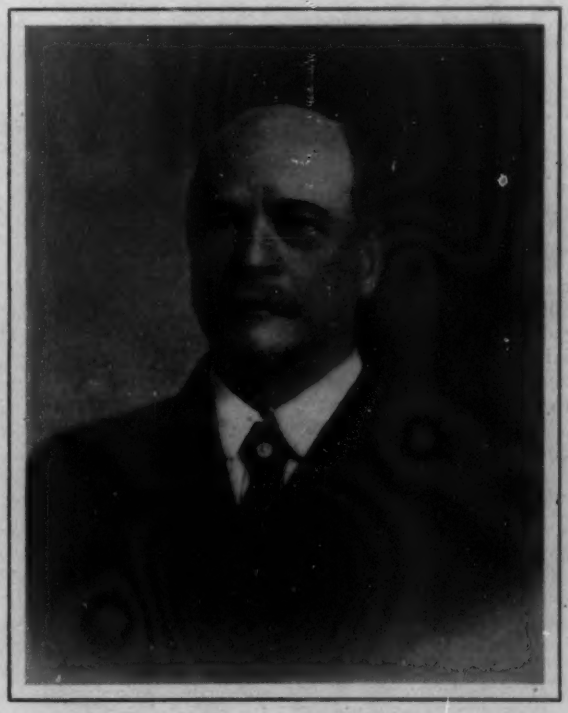
Starting Bessemer Steel Making in America*

The Story of Captain Robert W. Hunt's Part in Making Steel Production on a Large Scale Commercially Possible

It would be false modesty on my part if I failed to acknowledge the great personal gratification which is given me by the honor you have bestowed upon me. A large part of my pleasure is caused by my knowledge that the reception of the medal by me is gratifying to the grand man in whose honor it was founded, and whom, for so many years, I have been privileged to know as my more than friend. My only sad thought is that his ill health keeps him from being personally with us tonight.

Engineering Equipment at the Time

The history of the early days of the Bessemer process is almost, if not really, romantic, and would be impossible under present conditions. Since that time so great progress has been made in chemical and other metallurgical research that what was then almost mysterious is now not only understood but known to be controllable under recognized laws. When we recall that Bessemer himself announced that iron containing more than a trace of phosphorus was unsuitable for his process and that later analyses of steel made by him and others about that time have given numerous instances of considerably over 0.10 per cent. of that element, we can appreciate that the then supposed chemical knowledge was not very accurate, and indeed was calculated to deter progress.



Robert W. Hunt

Experience with refractory materials had been very limited, particularly when used in contact with molten metal at high temperatures. Engines to blow air at high pressures and in large volumes were undeveloped. The use of electricity as power was unknown, and many other quick-acting and labor-saving developments have been of subsequent years.

What Personal Friendships Accomplished

I recall those conditions by way of emphasizing that things which would to-day be easy were then hard; but we had the benefit of an element which, under our then environments, exercised a greater power than I believe would be possible to-day; and that was personal friendships. In the earliest days of the Bessemer process in America there were but two Bessemer plants, at first controlled by rival interests. They were soon merged under one controlling power so far as the Bessemer and other patents were concerned, but remained distinct in other commercial aspects. The result was that the men operating the quite slowly projected additional plants were comparatively few in number and were naturally drawn together by their common difficulties and the fascinating problems incident to the effort of overcoming them.

This spirit of comradeship was largely inaugurated and fostered by the commanding intellect and, more than all, by the love-compelling personality of the man who became the consulting engineer to most of the works—Alexander Lyman Holley. A bond of brotherhood existed under which one man's difficulties were the concern of all the others, and the means by which one overcame a trouble was at once added to the knowledge of all the others. I do not believe such a condition would to-day be at all possible, but it existed then, and what a coterie it developed!—A. L. Holley, George Fritz, Captain William R. Jones, John E. Fry, Robert Forsyth, and, a little later, D. N. Jones, Owen Leibert, Theodore R. Wolf and Horace Smith, with Uncle John Fritz as our constant adviser and monitor. William F. Durfee, John C. Thompson, John B. Pearse, H. S. Nourse and others were also among the early workers and did many notable things, but they were not exactly considered as members of the "Order of the Bessemer Boys."

The Early Bessemer Trials in America

Personally, it was my fate to be sent on May 1, 1865, by the Cambria Iron Company, in whose employ I was as chemist to the experimental Bessemer, or rather, as it was then called, Kelly process plant at Wyandotte, Mich., in which the first heat of pneumatic steel blown in America had been made in the fall of 1864, and from that day in May until March 31, 1888, my life was directly connected with Bessemer steel making. While I was not quite at its

*Speech of acceptance of John Fritz medal for 1912, awarded December 5, at the Engineering Societies Building, to Capt. Robert Woolson Hunt "For his contributions to the early development of the Bessemer process."

American birth, I was called in a long time before the troubles incident to such occasions had been overcome.

The converters at Wyandotte had a capacity of only 2½ tons and were located in the casting house of a charcoal blast furnace so that direct metal could be used, and under William F. Durfee's direction it was accomplished, but the regular, or I had better say irregular, practice was to use metal which had been melted in an air furnace, thus following the European practice. Later, under Z. S. Durfee's direction, we made a heat from iron melted in a cupola located in an adjacent foundry, and still later I replaced the air furnace by a cupola, and this inaugurated that which later became the regular American practice. We also, in a somewhat crude way, used the bottom casting of ingots. Later, at the Pennsylvania Steel Company's plant, and more thoroughly at the Cambria plant, while under my management, that practice was perfected, A. L. Holley, William R. Jones, John E. Fry and I uniting in the protecting patents.

The American Blooming Mill

The Cambria works had the fortune to roll the first steel rails made in America on a commercial order, from ingots cast in the Pennsylvania Steel Company's plant at Steelton, Pa., the rail mill at Steelton not being completed and the Pennsylvania Railroad Company being anxious to try some American-made Bessemer rails. I had charge of the rolling under the direction of George Fritz, the chief engineer and general superintendent of the Cambria works, and the event was made more notable by Mr. Fritz's experimentally demonstrating that the reduction of steel ingots into blooms by rolling was preferable to performing that work by hammering, as was then the universal practice. Hence the American blooming mill.

Successful Tapping of Slag from Cupola

At Cambria we first perfected the practice of tapping slag from the cupolas in which the iron for conversion was melted, and thereby made possible a much larger output of steel. Previously it had been only possible to keep a cupola in operation not exceeding 24 hours; the cinder tapping increased the run to three or four times as long a period.

First to Make Special Steels by Bessemer Process

The years of 1877-78 were dull ones in steel rail making, and as the Albany & Rensselaer Steel & Iron Company, Troy, N. Y., had extensive iron merchant mills in addition to its steel rail mill, and as the general superintendent of the company I was naturally anxious to have the steel works and as many trains of rolls as possible kept busy, and taking lessons from the Swedish exhibit of Bessemer steel products at the Centennial Exposition in 1876, I induced our people to take up the making of special steels by the Bessemer process. In that work I had the able assistance of Dr. August Wendel, the company's chemist, and I believe I am safe in claiming that we were the American pioneers in making such steels, which embraced steel for carriage and wagon axles, drop forgings of all kinds, scythes, rifles and musket barrels, springs and even rock drills, the steels ranging in carbon content from less than 0.10 to 1 per cent., and the Troy products enjoyed an enviable reputation. Dr. Wendel and I united in securing several patents covering what we considered important features of the production.

Automatic Machinery for Rail Mills

Following a change in a large part of the ownership of the Troy works, among other alterations and additions, we remodeled the rail mill, and I embraced the opportunity to put in automatic machinery for handling the steel while being rolled into rails. It had required 14 men; we reduced this number to four, and lessened their physical labors. Max M. Suppes was the master mechanic of the works and gave me valuable assistance, and we united in some of the patents protecting it. Following the successful working of the plant, Capt. William R. Jones, general superintendent of the Edgar Thomson Works, attached automatic tables to that rail mill, under license from us, and as he added some new features which he protected by patents, he pooled his interests with Mr. Suppes' and mine, and together we subsequently granted licenses to a number of the principal rail mills. Naturally, the able gentlemen in charge of the different mills made improvements upon our plans as they adapted them to their several requirements. Other engineers have devised labor-saving automatic rail rolling machinery, but such is the history of the Hunt, Jones, Suppes tables and the beginning of American automatic rail rolling.

While overcoming the many difficulties which we encountered while perfecting the Bessemer process and making it and its products successful both technically and financially, we demonstrated the value of numerous details, the importance of some of which seem to have later become lost sight of until they are now being, in some instances, rediscovered and hailed as heretofore unknown truths. However, if their importance shall thus again become recognized and beneficial results are obtained, good will have been accomplished; but perhaps seeking information from history might be a less costly way of finding facts.

In accepting the honor of receiving this medal, I feel that I am thereby also acting as the representative of those others who did so much in making early American Bessemer history—alas, alas, almost all of them have passed to the Great Beyond, and we who are yet here can only cherish and rejoice in the memory of their help and friendship—a priceless heritage. But why could they have not also been spared to witness the wonderful fruition of their labors?

Johnstown's Importance in Steel

President Farrell on Early Achievements and the Cambria Company's Progress

A testimonial banquet was tendered by 160 of the leading business and professional men of Johnstown, Pa., Thursday evening, December 5, to President James A. Farrell, of the United States Steel Corporation; William H. Donner, recently elected president of the Cambria Steel Company; Daniel Coolidge, president of the Lorain Steel Company, and John A. Reis, vice-president of the United States Steel Corporation. The guests of honor arrived in Johnstown on Thursday morning and made an inspection trip through the Cambria Steel Company and the Lorain Steel Company plants. The arrangements for the banquet were in the hands of a committee of which J. L. Replogle, vice-president of the Cambria Steel Company, was chairman, and it was a notable success in every way. The principal address of the evening was made by James A. Farrell and short addresses were made by Messrs. Donner and Coolidge. Mr. Farrell paid tribute to the ability of those who had led in the development of iron and steel manufacture in Johnstown, referring with appreciation to the work of Powell Stackhouse and Charles S. Price. In speaking of the part Johnstown had taken in the upbuilding of the steel industry, he said in part:

"The first Bessemer steel rails rolled in the United States on order were produced here in 1867, although experiments had been carried on prior to that time by the North Chicago Rolling Mill Company. Here it was that William Kelly, an iron manufacturer, who discovered the pneumatic principle of the so-called Bessemer process several years before Bessemer himself successfully employed it in producing steel in commercial quantities, found at the works of the Cambria Iron Company an opportunity to conduct experiments in a converting vessel similar to that now used in the Bessemer process, and to the Cambria Steel Company belongs the credit of having built the first converting vessel. This converter, which was installed for experimental purposes some 50 years ago, has been reserved as of historical value, and can still be seen in the offices of the Cambria Steel Company.

"Capt. Robert W. Hunt, who was awarded the John Fritz medal for this year, was the original iron works chemist of this country—starting with Cambria in 1860—and in July of 1911 he celebrated the fortieth anniversary of the first regular rolling of steel rails here. * * *

"The gentlemen who advertised for cordwood for fuel for the Cambria forge in 1817, and the firm whose nail factory produced 20 tons of nails in this vicinity in 1820, no doubt had their trials and tribulations. While the methods of to-day cannot be compared with those of generations ago, I believe changes in commercial practices have been as radical as those in manufacturing; but, marvelous as has been the progress, there is need to pre-

serve what we have gained and to correct where we have been deficient. The necessity for technical training is apparent in these times in the conduct of large operations, but not more so than the qualifications necessary to merit approval in commercial life. It must be a source of satisfaction to the citizens of this community to know that right in their midst are industries, facilities and resources which furnish opportunity for your young men to achieve success, providing they have the will and desire to take up a man's work with a man's spirit, cultivating thoroughness and application to fundamentals. These elements are as capable of development in workshops as in colleges.

"It is no doubt gratifying to the citizens of Pennsylvania that their State is first in the Union in the production of coal and pig iron, and that their proportion of the country's pig iron capacity of 35,000,000 tons is 15,000,000 tons, nearly equal to the whole of Germany's present capacity. In your own city, in addition to the steel industry, you have developed many important manufactures, and all indications point to a great future for your community.

"William H. Donner, whom it has been my pleasure to know for many years, is eminently fitted in experience, energy, courage and foresight to guide the great organization of the Cambria Steel Company and, with the cooperation of his lieutenants, Vice-president J. L. Replogle and General Manager E. E. Slick (whose careers as natives of Johnstown afford an inspiration to the young of this community), and the support of the officials and employees of this great works, the continued success of the company and the attendant prosperity of your city seem assured."

W. M. Duncan, receiver of the Wheeling & Lake Erie Railroad, has applied to the United States Court in Cleveland for authority to issue $4,081,000 worth of receivers' certificates for new rolling stock and improvements. The expenditure of $3,100,000 is proposed for 3000 freight cars; $450,000 for 20 freight locomotives of the consolidated type; $319,000 for improving the dock equipment at Huron, Ohio, and $112,000 for bridges.

The Reading Iron Company, Reading, Pa., is planning for considerable improvements to its plant at Seventh and Laurel streets, which will include an addition to the pipe mill and a dipping plant.

New Gas-Fired Heat-Treating Furnaces

The Gilbert & Barker Mfg. Company, Springfield, Mass., has brought out a new design of gas furnace for the treatment of metals. The characteristic feature is the replacing of cast iron by sheet iron wherever possible, the cast metal being confined to the bottom and legs. The sheet iron is reinforced with angle iron for strength. Some of these furnaces are shown in the accompanying engraving, Figs. 1, 2 and 3 being the semi-muffle oven, the end forging and welding and the cyanide hardening furnaces respectively.

In designing these furnaces the theory is that sheet iron will stand expansion much better than cast material, a factor which is held to be especially important in furnaces of the smaller size. For this reason the pattern tile has been replaced by a built-up construction of small tiles with a few slabs where necessary, bound together by a special cement. The semi-muffle and the end forging and welding furnaces are built in 16 sizes. The heating chamber of the semi-muffle furnace, Fig. 1, varies from 5 to 7½ in. in hight; 6 to 21 in. in width, and from 8 to 42 in. in depth. The dimensions of the end heating furnace for forging and welding, Fig. 2, range from 1½ to 3 in. in hight, 5 to 36 in. in width, and 2½ to 10 in. in depth. The round pot cyanide hardening furnace illustrated in Fig. 3 is built in ten sizes, varying in diameter from 3 to 16 in., and having an inside depth of from 5 to 18 in.

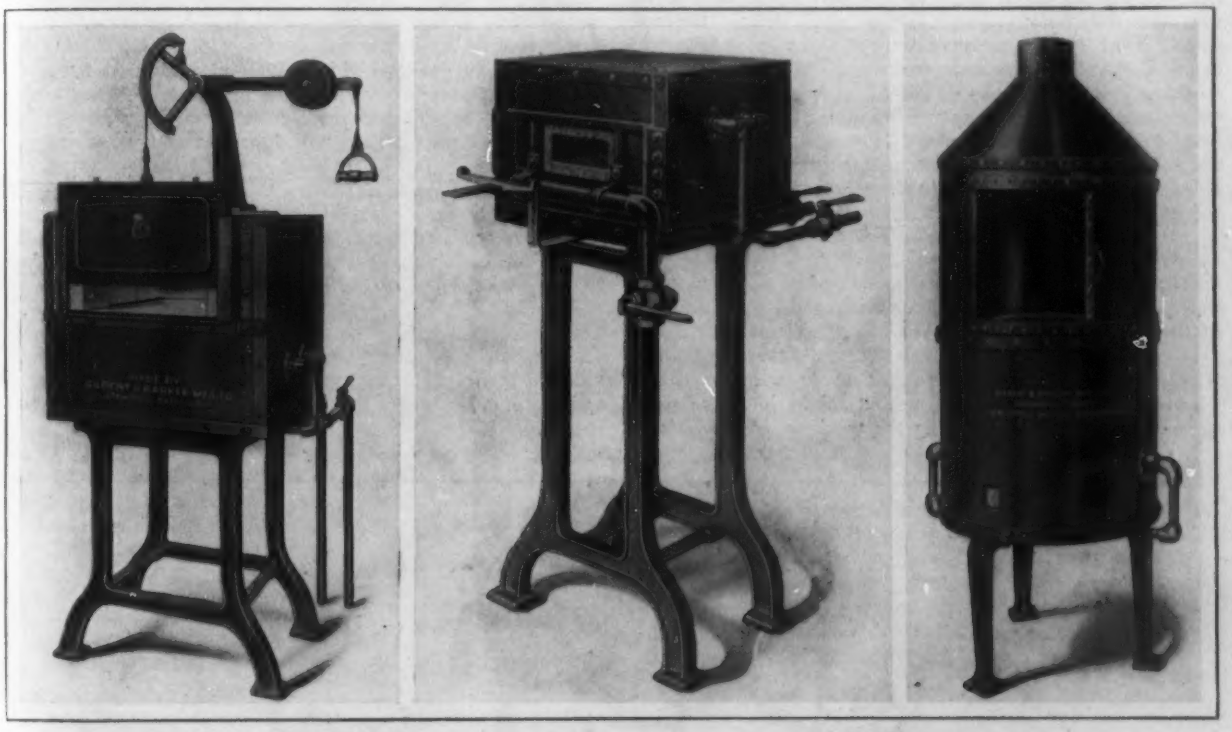


Fig. 1—The Semi-Muffle Oven Furnace Fig. 2—End Forging and Welding Furnace Fig. 3—Cyanide Hardening Furnace
Three of a New Line of Heat Treating Furnaces Using Gas as Fuel Built by the Gilbert & Barker Mfg. Company, Springfield, Mass.

The Navy Department, December 6, awarded contracts for building six torpedo boat destroyers, authorized by the last session of Congress. The Wm. Cramp & Sons Ship & Engine Building Company, Philadelphia, will build three vessels at $842,000 each; Bath Iron Works, Bath, Maine, one at $810,000; Fore River Shipbuilding Company, Quincy, Mass., one at $845,000, and New York Shipbuilding Company, Camden, N. J., one at $873,500. There were two bidders from the Pacific coast but their prices were too high.

The Executive Committee of the National Metal Trades Association was entertained by the Executive Committee of the Chicago Branch at a dinner Wednesday evening, December 11, at the Hotel La Salle, Chicago. An informal reception followed the dinner. Members of the Chicago Superintendents' and Foremen's Club attended the reception.

Grinding Machine for Large Mill Rolls

The lack of a machine for handling rolls up to a maximum diameter of 32 in. and having a body length of 108 in. led the A. Garrison Foundry Company, Pittsburgh, Pa., to develop a machine of its own. Before designing the machine a number of experiments were made to determine whether it was wise to attempt to finish a roll from the rough entirely by grinding, and the results showed that while this was not desirable, a grinding machine of proper design could be used to advantage in dressing and regrinding the rolls instead of the combination of a lathe and a grinding machine. The special features considered in the design of the machine were the rapid removal of stock and the class of labor used in routine mill work, together with the use of two grinding wheels.

As a result of the experiments mentioned, the machine was designed to remove stock much more rapidly than the usual polishing machine and the machine has been made as mechanically simple and as foolproof as possible. In this connection mention should be made of the automatic motor starters to render it impossible for the operator to abuse the motors in starting the machine.

The gears which rotate the roll have double spiral cut teeth, and all the teeth in the headstock train are cut. The use of two grinding wheels, one on each side of the roll is found of special advantage in making it possible to grind a cylinder to within 0.0005 in. of the correct dimensions without the use of calipers. The grinding wheel arbors are designed for easy handling and quick renewal. The carriage is reversed and the wheels are fed automatically at the end of each cut, and there is also a hand wheel for necking and grinding the neck fillets. It is also possible to turn a roll either hollow or taper it at the ends by adjusting the machine, the attachment for these operations being simple and accurate.

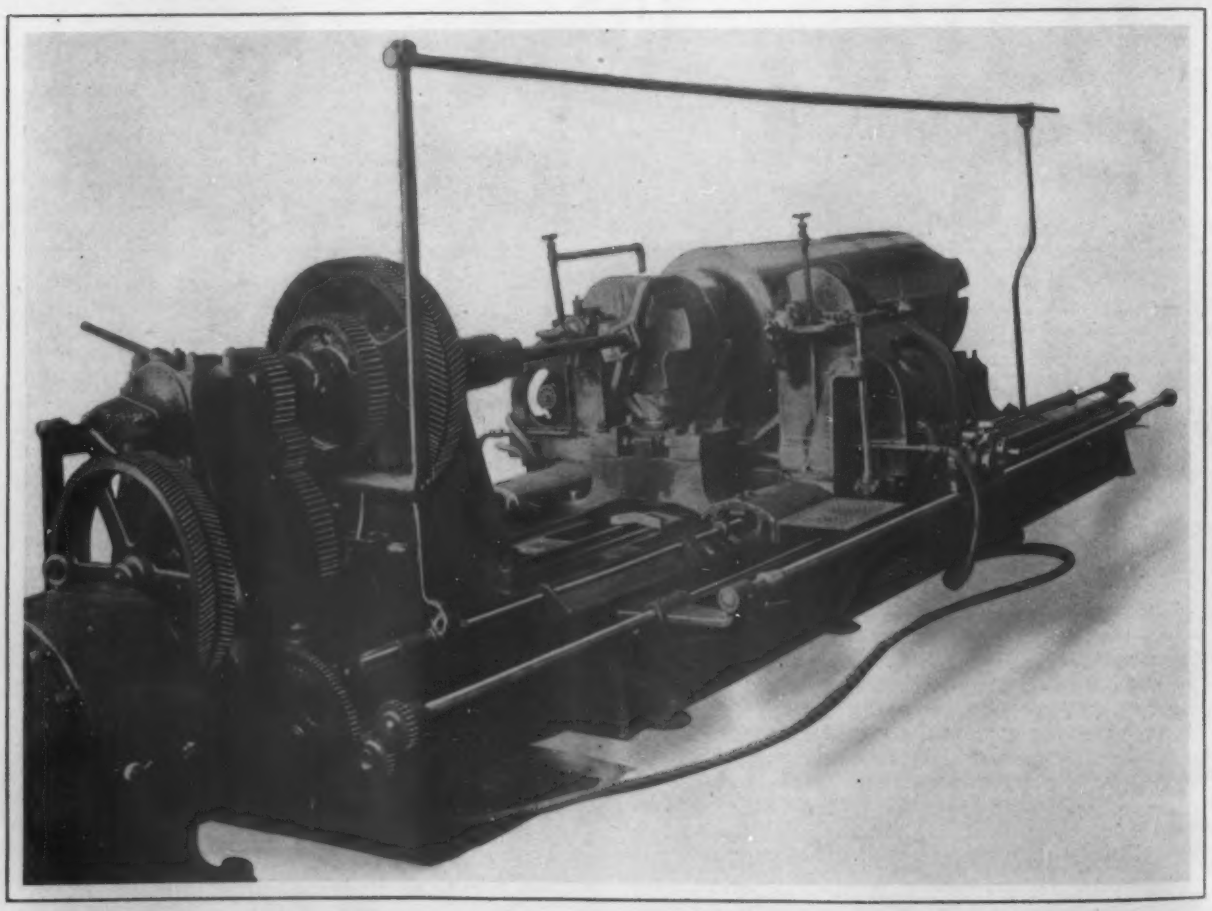
The machine is driven by three independent motors. One of these drives the roll and traverses the carriage, while the other two, which are directly connected to the grinding wheels, are supported by and travel with the carriage. This arrangement does away with overhead belts or any other construction that might interfere with the use of a crane in bringing the work to and from the machine. Full electrical equipment is furnished, including automatic starters and a pump driven directly from the macine.

Mesta Machine Company Contracts

Important contracts recently taken by the Mesta Machine Company, Pittsburgh, Pa., include the following: Three Mesta horizontal, tandem, four-cycle gas engines for the Canadian Car & Foundry Company, Montreal, Canada; these engines are 800 hp. and will operate on producer gas. Three Mesta horizontal, tandem, four-cycle gas engines to the Alpha Portland Cement Company, Cementon, N. Y., 800 hp., operating on producer gas. A large roll lathe, for export to Italy. The company states that orders for miscellaneous steel castings, cut and machine molded gears, sand, steel and chilled rolls and sundry rolling mill machinery are coming in regularly, and give assurance that the plant will operate at practically full capacity for the entire year 1913. Some of the most important shipments made last month were a 44 and 84 x 60-in. Mesta high speed blowing engine to the Shenango Furnace Company, Sharpsville, Pa., being the second engine of an installation, the first having been shipped last month; a 108-in. barometric condenser to the Carnegie Steel Company at Mingo Junction, Ohio. A large reversing engine for the Youngstown Sheet & Tube Company will be ready for shipment within 30 days. This engine will weigh approximately 1,300,000 lb., and is the engine for which the castings for two large bed plates required about 260,000 lb. of metal apiece. This engine at maximum speed will develop about 35,000 hp.

A 5-kw. size of gasoline electric generating sets has been developed by the B. F. Sturtevant Company, Hyde Park, Mass. The motors are of four or six cylinders and of the automobile type.

The San Francisco quarters of the H. W. Johns-Manville Company have been removed from New Montgomery and Natoma streets to the corner of Second and Howard streets.



A Grinding Machine for Handling Mill Rolls Up to a Maximum of 32x108 In. Built by the A. Garrison Foundry Company, Pittsburgh, Pa.

High Carbon in Charcoal Pig Iron*

Investigations Showing It to Be the Cause of Weakness and Low Chill— An Unknown Modifying Factor

BY J. E. JOHNSON, JR.

[In the introduction to his paper the writer referred to the conditions in the Lake Superior charcoal pig iron trade in the summer of 1910, when the Lake Superior Iron & Chemical Company took over six furnaces in the Lake Superior district. Southern and Eastern warm-blast charcoal irons were bringing $23 to $33 a ton, while Lake Superior charcoal irons of far superior analysis were a drug on the market at from $14 to $16 a ton. An investigation to determine whether this market condition represented actual differences in the values of the respective irons was undertaken by the company and is still in progress. The paper gives some of the results of the inquiry thus far.—EDITOR.]

Properties Not Shown by Analysis

An investigation [by the Lake Superior Iron & Chemical Company] along the lines of consumption showed that different irons have different characters totally independent of their analyses. I do not for a moment intend to imply that the accepted opinions concerning the control of carbon condition by silicon, fluidity by phosphorus and chilling qualities by manganese are not in a general way correct. I do intend, however, to declare that the presence or absence of these elements *alone* will not account for all, scarcely for a half, the facts which have long been known, not to us, but to those who used high grade irons for special purposes.

Investigation showed that there were foundries using chemistry not only for silicons and sulphurs, but also for carbon determinations and advanced work of that kind. We found that such foundries had proved by the most irrefutable tests that they could take a certain iron of a given analysis and produce certain results with it in chill, depth and uniform interlacing of chill with gray, hardness and toughness of chill combined, with corresponding resistance to abrasion, freedom from pits and from local failures of various kinds. With another iron of the same analysis they could not produce these results at all.

This was true not only of charcoal iron as compared with coke, but of one charcoal iron with another. We found that some car wheel manufacturers knew how to produce and did produce regularly, when they could sell them, wheels that would give service of many thousand miles in excess of that given by other wheels of their own make, made to be sold to people who insisted on having low price rather than quality. We were shown pieces of castings made with these different mixtures which contained ocular evidence sufficient to convince the most obstinate that there were physical variations not dependent on similarity of analyses in any recognized element.

As a result of these conditions there have grown up branches of the foundry trade forming a relatively small fraction of the whole, but of enormous commercial importance nevertheless, whose whole product is based on their being able to secure and to use irons which give them qualities beyond those obtainable from the ordinary coke foundry irons. These are particularly the manufacturers of chilled rolls and of chilled car wheels, though there is a growing demand for irons of high strength and close grain without great chilling qualities, for many purposes, notably gas engine cylinders and the like.

Our investigation has now been in progress for two years, but we do not yet consider that we are within measurable distance of the final solution of the great question why one iron should be so different from another of the same analysis. But experiments on the furnaces themselves, covering the widest possible range consistent with commercial operation at all, have indicated to us methods whereby the quality of the iron may be vastly improved.

Grading Card for Lake Superior Irons

Experience with Lake Superior charcoal irons taken in conjunction with frequent analyses had led to the adoption of a grading card, based on silicon, chill and manganese content, which is given herewith:

Grade	Silicon average, per cent.	Chill against plate	Manganese car wheel grade, lower limit, per cent.	Manganese malleable grade, upper limit, per cent.
AA Scotch	*3.00			
A Scotch	2.75			
B Scotch	2.50			
C Scotch	2.25			
No. 1 Soft	2.00		0.70	0.70
No. 1 Special	1.75		0.70	0.70
No. 1 Foundry	1.50		0.70	0.70
No. 2 Low	1.25		0.70	0.70
No. 2 High	1.00	No chill	0.70	0.70
No. 3 Low	0.80	Feather	0.60	0.60
No. 3 Medium	0.65	1/16" to 1/8"	0.55	0.55
No. 3 High	0.55	1/8" to 3/4"	0.50	0.50
No. 4 Low	0.45	3/4" to 1 1/4"	0.45	0.45
No. 4 High	0.35	1 1/4" to 2"	0.40	0.40
No. 5 Low	0.30	Near white	0.35	0.35
No. 5 High	0.20	White, spot of graphite	0.30	0.30
No. 6 White	0.10	Clear white		

*And over

It will be noticed that there is an assigned depth of chill for each analysis. To gauge the chilling qualities of an iron it is the custom to have a heavy block of cast iron planed on one side, which forms a portion of one side of the pig mold for one pig in every third bed. The chill on this chilled block is the one referred to in the grading card given above. The grading card was based on the three principal lines of consumption of these irons, as follows:

1. Straight foundry work, especially that of the better class where strength and density of grain were required, but not chilling qualities.

2. The production of chilled casting, principally car wheels and chilled rolls where manganese was supposed to be beneficial.

3. The production of malleable cast iron, in which low manganese is generally specified.

It will be noticed that the silicon limits from one grade to another are very narrow and that the grades run much higher than No. 1. This is probably, to some extent, because the small quantity of sulphur present does not neutralize much of the effect of the silicon, so that the latter reaches the limit of its effect much earlier than in irons with higher sulphur; consequently No. 1 soft charcoal, with 2 per cent. silicon, corresponds in some of its qualities, with No. 1 soft coke iron with 3.25 per cent. silicon. For the foundry trade silicon is needed for scrap-carrying purposes and the like, as with coke irons, and irons with more silicon than No. 1 soft are graded as Scotch irons.

Because of the rapid variation in grade, with small variation in silicon, the practice was early established of taking a sample for silicon analysis from every third bed and grading the iron by the results of these silicon determinations. Two manganese determinations were also made on each cast. This grading card was established several years ago, and while it has recently been amplified the silicon limits of the grades are practically unchanged.

Good Irons and Bad Irons

When we began our investigation one of the great difficulties was to find out what was good iron and what was bad. Was a strong iron necessarily a good iron, or a weak iron necessarily a bad one? It will seem incon-

*Portions of a preliminary paper on "The Effect of High Carbon on the Quality of Charcoal Iron," presented at the Cleveland meeting of the American Institute of Mining Engineers, October, 1912.

ceivable, but it took a year and one-half before we found anyone to give us a definite answer to this question. It was finally answered by the superintendent of the car wheel foundry of a large railroad system, who by his practical knowledge of the business and by physical tests of the irons he purchased, combined with judicious mixing and excellent foundry practice, produced wheels that stood an average of 95,000 miles in service, as against an average of from 30,000 to 45,000 miles for the wheels of the ordinarily commercial wheel foundries.

This gentleman assured us that for his purpose a good iron was a strong one, and a strong one a good one. The standard of strength with him was a 2-in. square bar, broken transversely on centers 12 in. apart. If the strength for a given grade was up to certain limit and the chill of a certain depth, the iron was good. If not, the iron was undesirable for his purposes and was rejected.

Two Trade Traditions Confirmed

There were two well-established traditions in the business when the investigation was begun. One was that an iron with a white chilled spot in the center of the pig, which is sometimes produced, was weak and utterly worthless for the manufacture of chilled car wheels, or for any other purpose requiring a strong tough chill. This is commonly known as "spotted iron."

The second was that an iron was made under certain conditions in which the grain was exceedingly close, verging slowly into a chill of greater intensity than the silicon contents of the iron would explain, and that this was a very strong tough iron, particularly suited for cylinder castings on account of its high strength and exceedingly close grain, taking a high finish. In consequence it was given an individual name, "special cylinder iron," and saved for certain customers to whom it was particularly valuable, though it is a lamentable fact they formerly got it without paying anything like an adequate price for it. This iron is produced as the result of certain unusual furnace conditions, and may have any silicon contents from 0.5 to 2 per cent.

The first positive results of the investigation were to prove that this special cylinder iron was far stronger than normal, and that on the other hand the spotted iron was far weaker, thereby confirming thoroughly the traditions of the practical men, whom it had been the custom to deride.

We soon found that one carbon determination per day was not enough, and we then added an extra man in the laboratory and began to get total and graphitic carbons on every cast in addition to the six silicon and two manganese determinations for each cast. We added also a phosphorus and sulphur determination for each cast, and by means of the latter destroyed the beautiful delusion that good charcoal iron ordinarily contains about 0.01 per cent. sulphur, since accurate determinations show nearly all of it to contain from 0.015 to 0.020 per cent. even when made from the best of ores, and very much higher if there is more than a trace of sulphur in the ore.

Spotted Iron

The opinion gradually took shape in my mind that the spotted iron, the normal iron and the special cylinder iron were the members of a continuous series of increasing quality and that if we could find out the cause of the spotted iron and the proper method of prevention, we would have at least part of the problem solved. This view has gradually been confirmed by the progress of the investigation, and we have further found some of the factors which tend to increase the strength of the iron and move it from the normal to the special cylinder quality. We do not feel that we have yet reached the complete solution of these matters in such a degree as would make their publication safe and desirable, but we think we have succeeded in finding the cause of the spotted iron and in connecting up its analysis and physical qualities.

Fig. 1 is a photograph of a representative piece of spotted iron. It shows the white spot in the center with two rudimentary branches extending toward the upper corners of the pig. At first it seemed that the location of the white spot indicated that it was a segregation product, and analyses were made of the gray portion outside and of the white spot, with the result of finding that the total carbon was about 0.5 per cent. higher in the former than in the latter; but there was no material variation in the other elements, certainly none in either the silicon or the manganese, which would account for the internal chill, in spite of its being slowly cooled.

The ordinary explanation of this phenomenon has been that the center of the pig was still liquid when the exterior had solidified, and that the expansion which accompanies the evolution of graphite was not permitted to take place on account of the contraction of the solid envelope on the liquid interior, but as iron of all grades cools under precisely these conditions and only a small percentage of it is spotted, this explanation could not be regarded as satisfactory.

Laminations in Spotted Iron

Gradually investigation and observation developed the fact that the irons in the low and high No. 4 grades were most apt to be spotted, but that a tendency to spot was sometimes shown in softer grades, notably the No. 3 iron, even though the pig itself might not show any trace of spot. For instance, the test pins in these grades might have a very small spot, even when the pig had none at all. We have repeatedly heard the term "high cleavage" used in connection with the Lake Superior charcoal irons by experienced users, and we gradually found that certain irons which had this tendency to spot showed a degree of lamination where they were chilled or partly chilled that was almost beyond belief. In the corners of some pigs there could be seen with the naked eye alternate layers, perfectly white and solid gray, the white leaves being no thicker than ordinary writing paper, the gray perhaps twice as thick. It was obvious that such iron must break along the faces of these leaves of white, and that the term "high cleavage" expressed its quality more accurately than any other equally simple term.

Observation gradually brought out the fact that while the special cylinder irons showed a tendency to chill much more than their silicon contents would lead one to expect, these irons with a tendency to spot, even though not actually spotted, showed a chill much lower than their analysis would warrant, and more than a year ago we began the practice of marking such iron with a distinctive mark and forbidding its shipment to manufacturers of chilled car wheels or any similar article, because we found the testing machine confirmed the ocular judgment that these irons were of the general nature of spotted iron, and, therefore, very weak. We had photomicrographs made of the iron shown in Fig. 1, particularly of the spotted portions which are reproduced in Figs. 2 and 3. It is obvious that the masses of detached plates of which these areas are made up simply abut against one another and are not in any way interlaced, so that a very low intensity of stress will cause cleavage along the face of one or the other of them. We finally recognized the structure shown to be that of eutectic cast iron of 4.30 per cent. carbon. Earlier determinations of the carbon were repeated and it became evident that the first opinion that this was a segregation product was correct, and that the white chilled spot was the eutectic of 4.30 per cent. carbon, which had gone to the same relative position in the pig as that in which we find the segregated portion of a steel ingot, and for the same reason: that both had remained molten on account of their low freezing temperature after all the other portions of the mass were solidified.

From this point the investigation took up the two questions, What are the causes of this action? and How far does the action extend and how serious are its effects in industrial work?

More Cleavage in Hyper-Eutectic than in Hypo-Eutectic Irons

The iron shown in Fig. 1 was analyzed for carbon at eight points. It was found that the spot contained the highest carbon, except the gray portion immediately above it, which was only slightly higher. Further investigation made it clear that the cleavage condition, visible to the naked eye, is vastly more extensive in a hyper-eutectic spotted iron than in a hypo-eutectic one, and that it extends to the very exterior of the pig in the former and is more and more restricted to the center as the carbon is lower in the latter. The fracture of the iron at the exterior of the pig shown in Fig. 1 is not particularly high cleavage, whereas the iron shown in Fig. 4 is of most peculiar appearance. There are close-grained spots scattered all over its face, not perfectly white, but visible upon close examination

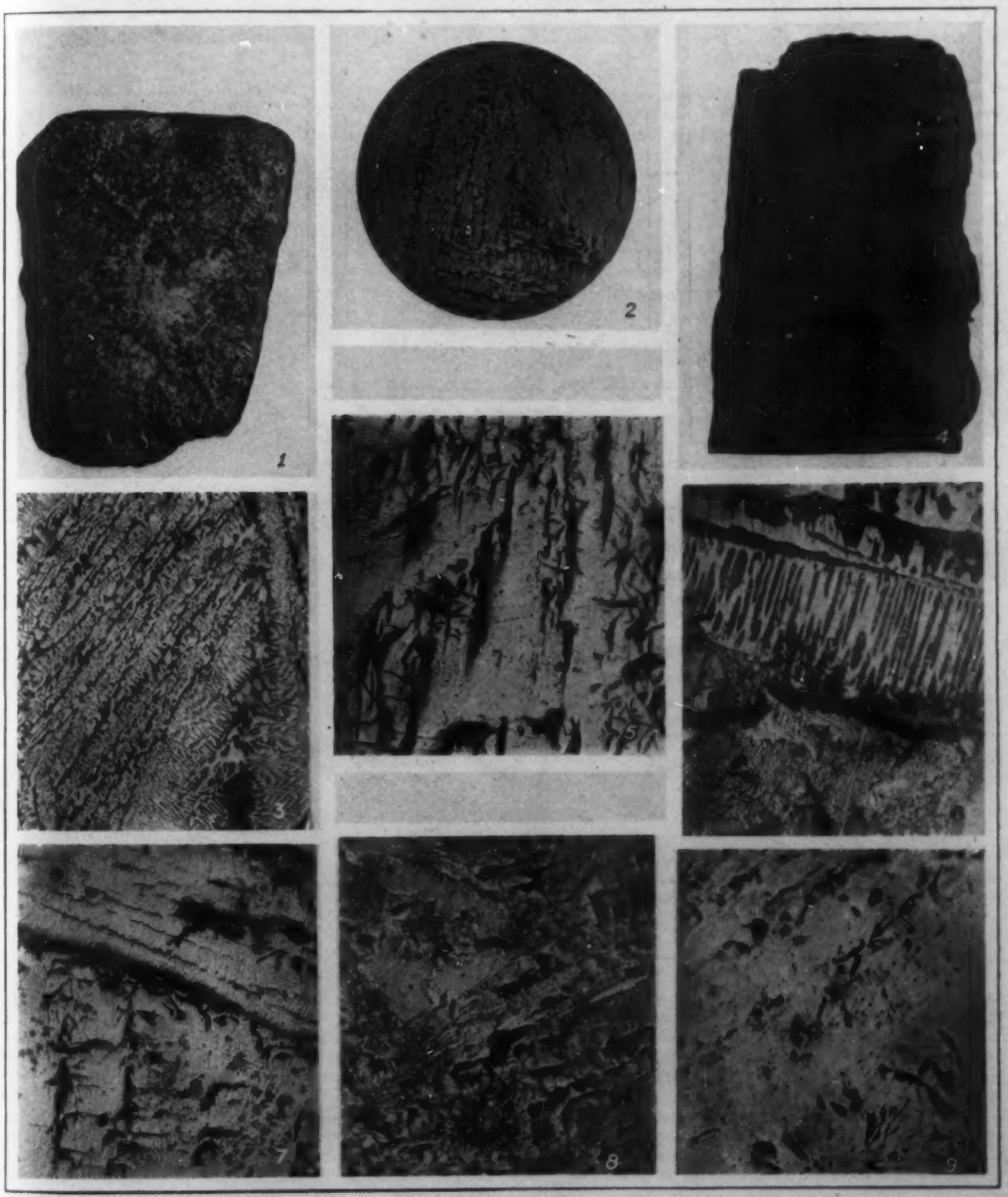
to the naked eye as plates of solid white alternating with layers of gray—in other words, the most accentuated condition of cleavage to be found. This cleavage condition is usually manifested particularly in the upper corners of the pig, and from one of these corners of this pig a specimen was taken, which was polished and photographed without etching so as to show the lamination and the orientation of the graphite. This appears in Figs. 5 and 6. The same sample, etched and at the same magnification, is shown in Fig. 7, and under higher magnification in Fig. 8.

In order to prove if a contrast existed, we took a similar corner of the pig shown in Fig. 1 and prepared a specimen in the same way. The result is shown in Fig. 9, unetched.

It will be seen at a glance that the laminated condition is much less and the graphite much less oriented in this specimen than in the other. This iron being a hypo-eutectic iron the portion which froze first was austenite and there were only puddles of eutectic left to make the few long flakes of this material shown. The graphite is fine, scattered and nodular, an indication of its being secondary graphite, while some of the graphite in Figs. 5 and 6 is large and in relatively long flakes, an indication of its being primary.

Allusion has been made to irons which had a tendency to spot without being actually spotted. These irons usually occur in the No. 3 grades. In addition to these, irons have been noticed in the No. 2 and even softer grades with a close spot in the center, surrounded by more open-grained material.

After getting this clue it was relatively easy to find from the results of the test bars that some of those casts with this fracture were likely to be below the normal strength for their grades, and by examining the upper corner of the pig it was possible in some of these cases to detect slight traces of cleavage. Accordingly a specimen was prepared from the upper corner of a pig of high carbon No. 3 and



EFFECT OF HIGH CARBON IN CHARCOAL PIG IRON.

Fig. 1—Typical Spotted Iron. Fig. 2—White Portion of Fig. 1. Fig. 3—White Portion of Fig. 1 Further Enlarged. Fig. 4—Low No. 4 Spotted Iron, Very High Cleavage. Fig. 5—Corner of Pig Iron in Fig. 4, Unetched, Showing Laminations. Fig. 6—Corner of Pig Iron in Fig. 4, Unetched, Showing Laminations. Fig. 7—Corner of Pig Iron in Fig. 4, Etched, Showing Laminations. Fig. 8—Corner of Pig Iron in Fig. 4, Showing Laminations. Etched and With Much Greater Magnification Than in Figs. 5-7. Fig. 9—Corner of Pig Iron in Fig. 1, Unetched. Note Relatively Slight Laminations Compared with Figs. 5 and 6.

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photographed without etching. The original pig is shown in Fig. 10, and the microphotograph of an etched specimen in Fig. 11. The cleavage planes and the orientation of the rows of graphite appear. It is concluded that some of the graphite in the hyper-eutectic iron is primary, and if so it will naturally occur in relatively large flakes quite thin in relation to their length and breadth. Further, the graphite not having any continuity of structure is obviously at the mercy of the eutectic crystals, and when the latter begin to form they can push the graphite flakes around so that while the long axes of the flakes may not be aligned the flakes as a body are arranged in windrows. This condition is plainly evident in Figs. 5, 6, 7, 8 and 11. Fig. 12 is the same as Fig. 11 at a higher magnification and shows the same condition within its limited field.

The Effect of Higher Silicon

It will be noticed that the plates of eutectic shown in Figs. 11 and 12 are considerably more broken up than the similar areas in Fig. 3. This is considered to be the result of the greater silicon content of the pig shown in Fig. 10 than that shown in Fig. 1, and is reflected in the solid gray fracture of the latter as compared with the partly white fracture of the former. The effect of silicon is obviously to break up these plates of eutectic into pearlite and cementite, and then, in some cases, to break the latter up into pearlite and graphite. If this be true then we should have an orientation of the graphite even in irons so high in silicon as to have left scarcely any traces of the original eutectic.

In order to prove or disprove this hypothesis we took a pig of low No. 2, in the corners of which we found faint indications of cleavage, and prepared a specimen from its upper corner. The orientation of the graphite was plainly visible and there were long windrows of white dots, representing all that was left of the cementite, which once composed part of the eutectic plates. Darker rows of graphite flakes were plainly observable between the windrows of white dots.

The grounds for believing that this was a hyper-eutectic iron in which the silicon had forced down the eutectic point to about 4 per cent. instead of 4.30 per cent. are the fact that the segregated spot was lower than the rest of the pig in carbon and the presence of the residual plates of eutectic in the corners.

We have endeavored to obtain specimens of coke iron containing white spots in the center, but so far without success. My recollection is quite distinct, however, that these irons are not infrequent in basic practice. We shall take the first opportunity to determine whether the same conditions hold in those irons as those here shown.

Chill and Casting Temperature

Allusion has been made to the fact that irons, either spotted or with a tendency to spot, are commonly deficient in chilling qualities as well as strength. The reason has not yet been worked out. It has been established beyond the possibility of a doubt that it is not dependent solely on the carbon in iron. We have seen two irons of the low No. 4 grade, of which the carbons were identical within the limits of chemical error (4.06 and 4.07 per cent.), and yet the chill on one was about ¼ in. deep and on the other about ¾ in. deep.

It is entirely possible that part of the cause may be the temperature at which the iron is cast. The tendency is for the chill to be reduced by casting at a higher temperature. It is fairly well established that high hearth temperature (other things being equal) tends to promote high carbon. It may, therefore, be that deficient chill and high carbon are the joint results of the same cause—high hearth temperature—rather than having any relation of cause and effect with one another. It must be borne in mind, however, as stated in the beginning, that there is some other factor, perhaps more than one, affecting the quality of the iron in addition to analysis in the ordinary elements, even including the results herein contained concerning carbon. We have had this fact forced on our attention in so many ways that we feel called on to reiterate it at every opportunity.

Conclusions Thus Far Reached

Some of the conclusions noted in the paper are the following: Spotted irons are products of carbon segregation. This may take place in irons containing either more or less carbon than the eutectic ratio, but is less marked and less likely to have ill effects the further the carbon is below the eutectic ratio.

When the fracture of an iron shows high cleavage at the edge it is almost sure to be up to or above the eutectic ratio and to be a weak iron.

Close spots not associated with cleavage may occur in irons of good quality, especially where the silicon is comparatively high.

While the work described has shown the cause of spotted irons and irons of high cleavage and the reason for their corresponding weakness, it is strongly believed that there is another condition or substance that makes for strength and for high chill with a given silicon content in just the same way that high carbon makes for weakness and low chill with a given silicon content. There are many things indicating that with this unknown condition properly fulfilled a relatively high carbon iron may be stronger and better than an iron of much lower carbon with this condition absent. Illustrating this are cold blast irons which command a price much higher than that of any other pig iron, yet are quite high in total carbon, frequently well over 4 per cent.

The author says in conclusion: "We are continuing the investigation to determine what the remaining unknown condition may be. We think we have proved that high carbon by itself makes an iron weak and poor, but low or moderate carbon by itself is not enough. It is my hope that we shall eventually discover what causes good iron to be good, as well as what causes poor iron to be poor."

Fig. 11—Corner of Pig Iron in Fig. 10, Etched

Fig. 10—High No. 3 Iron With Tendency to Spot

Fig. 12—Corner of Pig Iron in Fig. 10, Etched, With Much Greater Magnification Than in Fig. 11

Motor Truck Development

Fifty thousand motor trucks and delivery wagons is believed to be a conservative estimate of the number now in use in the United States, according to the publicity department of the commercial vehicle section, National Automobile Shows. Carefully compiled reports made at the beginning of the year showed that there were then, in round figures, close to 30,000, and State and city registrations of motor vehicles compared with those of a year before proved that the number of these vehicles is doubling annually.

Estimates of the probable production for the coming year vary widely, because many motor car manufacturers can regulate their output to correspond with demand. Based on the rate of increase in the past, the output should reach about 50,000. Rapid as has been the yearly increase in the number of pleasure automobiles, the percentage of increase in trucks and delivery wagons has been almost twice as great. There are more makers of commercial cars in America now than there are manufacturers of pleasure vehicles, the list comprising more than 300 names. Fully one-third of these will display their new models at the national automobile shows in New York and Chicago from January 20 to 25 and February 10 to 15, respectively.

Motor vehicles are used for industrial, commercial, municipal and federal purposes by more than 250 distinct lines of business. More than 4000 are operated in New York City and more than 2000 are registered in Chicago.

The total average cost of operation and maintenance of gasoline machines ranges from about $8.50 per day for a 1-ton truck to $18.50 a day for a 10-ton truck. The average for electric vehicles is approximately two-thirds of these figures, but their mileage is proportionately less. It costs a little more than $5.50 a day to keep and use a one-horse outfit, and $8.50 a day for a two-horse team, but a horse or team cannot average more than 15 miles a day against from 50 miles for a 5-ton motor truck to 100 or more for a 1-ton truck.

The actual cost per ton-mile of hauling with horses in the city is from 14 to 18c. with a double team, and from 20 to 35c. with a single horse. The cost per ton-mile with motor trucks, all items of overhead expense included, is from about 7c. for a 5-ton truck to 11 1/3c. for a 1-ton truck. In department store work with electric vehicles the cost of delivery varies from about 4c. to 10c. per package.

The lower cost of doing work with power wagons is, however, only one of the principal advantages realized from their use. Their increased speed and mileage capabilities enable a store to reach out into new territory too far to be served by horse delivery and to gain new customers by the quicker service. They also are more dependable and regular than horses in bad winter weather and during the midsummer season. All large users testify to this.

Physical Valuation of Railroads

The Adamson bill for the physical valuation of railroads passed the House of Representatives December 5 on a viva voce vote. It imposes a three years' task on the Interstate Commerce Commission and it is estimated that the valuation will cost $3,000,000. The bill directs the commission to engage the necessary number of experts to make a thorough inventory of the property of all railroads engaged in interstate commerce. It is provided that the investigation shall embrace the rolling stock, stock and bond issues and all assets and liabilities of common carriers. The report accompanying the bill declares that the anomaly has grown up in this country whereby railroads charge on what they owe as well as on what they own and that nowhere else does this condition exist.

Representative Sims, who had charge of the bill on the floor, asserted that a physical valuation of railroad properties was absolutely essential if the Interstate Commerce Commission was to have information making it possible to assess reasonable rates.

The Cleveland Branch of the National Metal Trades Association will give a banquet in honor of Henry D. Sharpe, president of the association, in the banquet hall of the Statler Hotel, December 17. A number of representatives of the Cleveland Chamber of Commerce and other Cleveland organizations will be guests.

The New High Record in Lake Iron Ore

Final figures for Lake Superior iron ore shipments in the season just ended show that the total movement by water was 47,435,777 tons as compared with 32,130,411 tons in 1911. This represents an increase of over 15,000,000 tons while it is nearly 5,000,000 tons more than in 1910 which was the previous record breaking year, a lake movement of 42,620,206 tons. The expected 48,000,000 tons was not reached in the past season because of the falling off in November, the movement during that month having been about 500,000 tons less than was predicted. Shipments in November were 4,072,674 tons, and three cargoes were shipped in December aggregating 14,579 tons—10,428 tons from Escanaba and 4151 tons from Two Harbors. Shipments by ports for the season are given below, together with a comparison with the three preceeding years:

Iron Ore Shipments from Upper Lake Ports—Gross Tons

	1912	1911	1910	1909
Escanaba	5,234,655	4,278,445	4,949,726	5,747,801
Marquette	3,296,761	2,200,380	3,248,516	2,909,451
Ashland	4,797,101	2,429,290	4,094,374	3,834,207
Two Harbors	9,370,969	6,367,537	8,271,177	9,181,132
Superior	14,240,714	9,920,490	8,414,799	6,540,505
Duluth	10,495,577	6,934,269	13,640,166	13,470,503
Total by lake	47,435,777	32,130,411	42,618,758	41,683,599
Total all rail	.....	662,719	823,639	903,270
Total shipments	.....	32,793,130	43,442,397	42,586,869

The all-rail shipments for 1912—chiefly those made to Duluth and to the various charcoal furnaces on Lake Superior, as well as those from the Iron Ridge and Mayville properties in Wisconsin—can only be estimated at this time. If they should prove to be equal to those of 1911, and the probabilities are that they are larger, the total shipments for the year would be about 48,100,000 tons.

It is worthy of note that as in 1911 Superior is the port of largest shipments—a distinction for so many years belonging to Duluth. For the next two years, or while the Steel Corporation is exerting itself to take out ore from the Hill properties to make up for the years in which it has fallen short of mining the minimum requirements under its lease, Superior is likely to continue in the lead.

The Mesaba range probably reached its highest percentage of the total production this year. Previously 67.37 per cent. was its maximum percentage, which was reached in 1911. This year's percentage will be above 68.

The United States Steel Corporation's percentage of this year's total will probably prove to be somewhat in excess of 50, though it will scarcely be up to that of 1911, or 52.7 per cent.

A Home-Made Factory Whistle

The Critchley Machine Screw Company, Worcester, Mass., has installed in its factory a Klaxon automobile horn which serves as the factory whistle. Those who are familiar with screw machines in operation realize the almost overwhelming roar which comes from a large battery of the equipment. The vibrations have a quality which overcomes other sounds, seeming to engulf and absorb them. On several occasions the sound of the old signal did not reach the ears of the operatives and they continued their labors for several minutes before they could be told that the hour for closing had come. Consequently the Klaxon horn was tried and proved to possess some quality of tone which was too much for the roaring of the machines, and the problem was solved.

The old Economy Foundry, Syracuse, N. Y., leased by E. C. Stearns & Co., of that city, is one of the largest of its kind in that locality and had been idle for a considerable period. The molding shop is 60 x 200 ft., built of concrete and steel, and is equipped with a 15-ton electric crane. Wings contain the power plant, a machine shop, core room and other departments. All the new equipment needed, such as molding machines, etc., will be built by the firm. The addition of this foundry to previous molding facilities will practically double the Stearns output of castings.

The Evens & Howard Firebrick Company, St. Louis, has established a Chicago office in the First National Bank Building, with H. E. Risher in charge.

The New Era in Machine Tool Design

Practical Points for the Consideration of Machine Tool Builders—What Must Be Done to Secure Efficient Tools

At a special meeting of the Cleveland Engineering Society, Cleveland, Ohio, November 26, E. P. Bullard, Jr., president of the National Machine Tool Builders' Association and also president of the Bullard Machine Tool Company, Bridgeport, Conn., delivered an address on "The New Era in Machine Tool Design." He explained that he chose this title for the address because he believes that a new era has come into the mechanical world; that our industries are being called upon to produce better goods at lower prices and to increase production, and that we must be more efficient in all our work as engineers or as shop managers. There is a demand of the masses to live better and to have the thousands of necessities and luxuries that this age has given us. He said:

The Machine Tool a Prime Factor in Civilization

The machine tool has got to meet this demand. The burden of this demand is directly on the machine tool, which is the prime factor. Granting that the machine tool is a prime factor in our civilization, it seems right that machine tool builders should exercise their energy to make the machine productive, useful and a help in the upbuilding of our other industries. There is not the difference between the machine tools of to-day and the machine tools of 10 years ago that there should be. They have not in all cases kept up with the times. Many of the machine tools are identical in detail with what they were 10 years ago. Anybody who is building a machine of that kind cannot hope, on account of its inefficiency, to keep up his trade, to keep up to date and to keep his factory full. The machine tool of to-day must meet the conditions of to-day.

In going over the various elements of machine tools, the question naturally arises, Wherein can they be improved? There are many ways. First let us consider the question of control. Control is the essence of machine tool design, probably the most important part, and plays the largest part in the production of work. The machine tool must not merely be started and stopped; it should be started precisely at the right time under perfect control and should be stopped exactly as you want it and stay stopped until it is again started. The machine tool should do the work; the ideal machine tool should do the work and the operator should use his energy solely in directing it. He should not be called upon to spend his valuable time or his mental energy in using an oil can around on 50 or 100 different holes which are supposed to be oiled. He should not be called upon to shift dangerous belts or move heavy parts. That can be done by power. There is absolutely no occasion to-day for an operator to be required to do those things, and any machine which compels the operator to use his physical energy to move heavy parts, to shift belts or any of those things which waste time and productive energy, is an inefficient machine.

The Essentials in Machine Tool Design

What then are the essentials in machine tool design? It seems reasonable that we should ask for productibility, the ability to produce. That is of prime importance, for that is what we buy the machine for, and if we can not get productibility we have not spent our money wisely. Second, durability. Productibility, of course, is qualified by durability. If it is not a durable machine, its ability to produce ceases. Third, adaptability. By adaptability I mean the ability of a machine to meet our conditions. I have then boiled the subject down to three essentials in machine tool design: productibility, which means ability to produce; durability, or the ability to stand up and continue to do the work; and adaptability, or the ability to meet our conditions. I have sub-divided these. There are several factors which enter into the question of productibility. The first is constant operation; a machine to produce properly not for the moment but for the period or term of years which we expect to use it in constant service. If for any reason it is not in service it is not producing and is a burden. The reason, maybe, is that it is not adaptable to our work, in which case the purchase has been made wrongly; or it may be that the machine is continually giving trouble in minor details, in which case it does not meet the requirements of durability; or it may be that in order to use that machine we have had to invest a large sum of money to produce something which we do not make in large quantities and for which we hardly feel warranted in expending the money. In case the machine has any of these defects it is not productive and therefore not efficient.

I believe the starting and stopping of a machine is possibly the most important function of the operating mechanism. It should start just when the operator wants it to. It should not start a little ahead of time; it should not lag and not get to work as soon as it ought to, and it ought to stop just exactly as you stop any other moving object. The starting and stopping of a machine are two very important parts or functions of that machine. Shifting belts will not accomplish it; they are too slow. Clutches are difficult to make. In fact, I think the failure of about 90 per cent. of the automobiles is in the clutch. The clutch does not work; it starts too quickly or it drags. And a clutch in a machine tool is just as important. It cannot be too good.

Power operation of heavy parts is here to stay. It may be inefficient on some machines; it may be inefficient on all, but the time will come when you cannot hire a man to run a machine in your shop unless the machine is equipped with mechanism for operating the heavy parts; consequently it is essential that we should produce machines that are equipped in that way. Incidentally, it is just as essential that we should perfect the operation and motion of those parts so that the machine is under absolute control as to starting and stopping.

Time Needlessly Lost in Setting Tools

In the matter of setting of tools. I have gone around the country into shops and I have made a little time study on my own account, the time which the average operator required for the setting of tools. I am convinced that about one-third of the total time you pay for is spent in securing sizes. For instance, a man takes a steel casting and he does not want to spoil it. He has got to reduce that to an exact sized piece to fit another piece. So he puts it on the machine and spends about 15 minutes cutting it down a little. After that he tries the calipers on the casting and finds that it is about ⅛ in. too big. He then starts in and repeats the operation three or four times. One man out of a thousand can set a machine accurately enough to do this work without wasting time, and the other nine hundred and ninety-nine will do just as this one did. Consequently your machine tool, to be efficient, should take this burden off the man and give him means of cutting those sizes accurately and of duplicating those sizes every time.

Under productibility comes the question of power. How often do you see a machine that can be loaded right up to all that the tool steel will stand? I suppose there are 50 compounds on the market for making belts pull easily, but let me tell you that your efficient machine tool should not need them, for the power will be there in the form of a big belt, a wide belt, and there will be plenty of strength of materials between to take all that that belt will pull. Power in abundance, excessive power is an essential part of your producing machine.

Now as to the correct distribution of metal. Probably every man, when he buys a machine tool, asks, as the first question, what does it weigh? What does that question amount to? If I, as a builder of a machine tool, wish to deceive you, I can pour pig iron into the base of the machine and give you weight that costs mighty little and is valueless to you. You would not have productibility because that weight would be in the wrong place. The correct distribution of metal is one of the very important

factors in machine tool design. I believe that our machines, as a rule, are light in some of the very essential parts, and I believe that when we come to have full understanding of where we should place that metal, how we should place it, and what kind of metal it should be, we will make a great advance.

The Use of Cutting Lubricants

There is another point we can make in the cutting of metals which has to do with the producing of work that seems to have almost infinite possibilities, and that is the use of cutting lubricants. I had it brought very forcibly to my attention some time ago that there was a large saving to be made in power by the use of cutting lubricants. A machine was in operation in our plant on a steel casting. The foundry had left about ¾ in. of metal on the periphery side of this casting which had to come off. The surface was about 16 in. wide. The machine was running along very nicely with two streams of water. There were two cuts, one on the top and one on the side. We shut down on the water to see what would happen, and the machine made one half of one revolution and the belt went off. We cut off the water again and it went less than a half revolution. I tried that enough times to convince me that there was something there I did not understand.

I had always thought that lubricant made the tools lose power. We attached a motor with a recording wattmeter to the machine and after several days of experimenting we satisfied ourselves that on the heaviest cutting there was a difference of 43 per cent. in the power required to machine that piece with cutting lubricant and without it. When we tried lighter cuts we found, of course, less difference. Further experiments along the same line showed us that pieces which we tried without any lubricant became so heated that it was not only difficult to handle them, but the dimensions were all out, so that a hole 15 in. in diameter when the piece was cooled became 15 in. plus 0.009 when a slight cut was taken across the top of the casting. I believe that not only will we turn steel with cutting lubricant in the future, but I believe that we will turn cast iron with cutting lubricant. Cutting lubricant is a thing you will have to deal with. It will represent an investment which is a wise one, and you will find that production will be increased in return for that investment, particularly when you come to turn the alloy steel.

We will now take up the question of durability. What are we going to do to make our machine stand up? We must use alloy steel. This is not the age of steel any more; it is the age of alloy steel. We have come to the point where the alloys introduced into steel give qualities which we never dreamed of. From this grade of steel we can produce a class of goods guaranteed to give certain fixed results. Such steel is not high priced. You cannot measure its value by the pound.

There is another thing that we have that we did not have 10 years ago. You can get castings to-day made of steel that run almost as good as cast iron castings, and the steel castings are infinitely stronger and we can get these on chemical analyses.

Forced Lubrication

I am convinced that forced lubrication, not squirt-can lubrication, is one of the elements in machine tool design which we must consider. I believe that five years from now all machine tools will be lubricated that way. The objection that is raised that the oil will get dirty is no objection. You can filter it if you want to do so. You can pump it up into your machine, distribute it to the running parts, and you will be surprised to see the efficiency of that machine so lubricated. I think it is a fair assertion to make that with properly proportioned bearings, the two metals coming in contact with each other, it is possible for us to get area enough so that the volume of oil will not stay there, and the life of the machine is prolonged indefinitely.

Another factor in durability is limited belt speeds. Belts are efficient up to a certain point, and when they run faster than that they cease to be efficient, and larger tools are required.

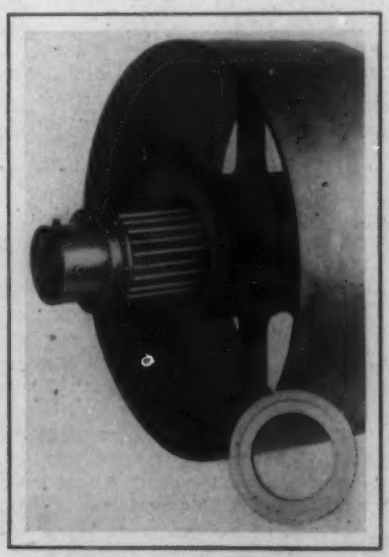
I now want to take up adaptability. Under this the first question is adaptability to our work. The tool equipment must be universal equipment. It should be standard tool equipment. Second, rapid setting up. If the total time for doing a piece of work is an hour, and a man has to spend half an hour setting it up, that time is lost. How can you save on that setting up time? By getting machines which, when you turn a lever, will go ahead as you direct. The machine which can be controlled will be adaptable because of the ability to set it up for each job in the shortest possible time; it will be efficient in that respect. To cut your cost properly you must cut out the time between cuts. There is where you can make a big saving in your shops, because it is time lost which you can save by using a machine which is so controlled that the change of speeds and changes of feed and everything else required to put that machine in operation can be done in the shortest posssible time.

If you can get machine tools at your plant complying with these three essentials which I have given you, you will have machines which will give the maximum production with a minimum cost; they will have a maximum life and a minimum maintenance charge; they will be efficient machine tools. I think that the concern that does not put steel gears into its machines will have to change its methods or stop. I think that the concern that does not adopt forced lubrication will in time have to stop. There are machine tool concerns that are complaining of keen competition, and the product they have to sell is not worth buying.

A New Pulley and Shafting Roller Bearing

A roller bearing which operates without lubricants has been brought out by the American Roller Bearing Company, Pittsburgh, Pa. The parts of the bearing are four in number: an inner casing, the bearing or load carrying rolls, the spacing rolls and the bond rings. It is the use of these two sets of rolls which contributes the anti-friction principle of the bearing and makes it possible, it is found, to operate without lubricants. The arrangement of the various parts of the bearing is brought out in the accompanying engraving.

The inner casing of the bearing is supported on the shaft or axle if the bearing is to be used in a vehicle, and carries the bearing or load rolls. The track for supporting the spacing or idler rolls, and upon which they roll as the bearing turns, is also located on this casing. The bearing or load carrying rolls are supported upon the inner casing and roll upon it when the bearing turns, being separated from each other by the spacing rolls which, of course, lie between them. These spacing rolls are kept in place by bond rings and the whole bearing is contained in an outer casing or hardened steel sleeve.



A New Type of Roller Bearing for Pulleys and Shafting Made by the American Roller Bearing Company, Pittsburgh, Pa.

The spacing rolls always revolve or turn in a direction which is opposite to that of the load rolls. In this way the spacing rolls accommodate themselves to the load rolls and this fact as well as the substitution of a rolling motion of both the load and spacing rolls and the inner supporting sleeve casing for a sliding contact, are found to eliminate friction and the consequent wear and heating. The bearings are made in two styles for use in vehicles and on lineshafts and if desired are supplied with dust guards and end thrust devices.

The railroads say that the new parcels post law makes no special provision for paying them for handling the new kind of traffic.

Two New Types of Screw Cutting Lathes

For handling general work in the machine and repair shop the South Bend Machine Tool Company, South Bend, Ind., has brought out a new 16 and 18 in. screw cutting engine lathe. This tool is built in both the straight and gap bed styles, the larger size of straight bed lathe being illustrated in Fig. 1, while the 16-in. gap lathe with a 6-ft. bed is shown in Fig. 2.

The 18-in. lathe illustrated in Fig. 1 was built to give service with high speed steel for turning, boring, chucking or any other work that comes up in the general run of machine shop operations. All the parts are simple in design and are within easy reach of the operator. The construction of the lathe is heavy and powerful and there are both power cross and longitudinal feeds which are engaged from the apron. The bed, which is of heavy construction,

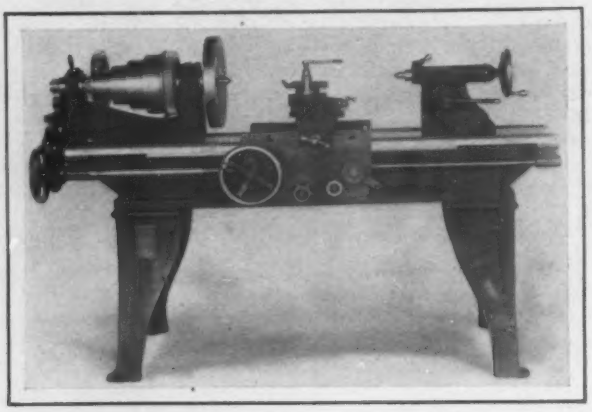


Fig. 1—The 18-In. Screw Cutting Lathe Recently Brought Out by the South Bend Machine Tool Company, South Bend, Ind.

is reinforced by cross braces and the web pattern headstock carries a four-step cone pulley upon which the 2½-in. belt runs. The steps of this pulley which range in diameter from 4½ to 9 in. in conjunction with the back gears give eight spindle speeds. The spindle is of forged carbon steel and runs in heavy bronze boxes. The builder's standard reversing device is also fitted on the headstock. This device is within easy reach of the operator at all times and can be operated instantly for cutting right or left-hand threads, feeding in either direction or left in a neutral position when the spindle is running at a high speed for filing or polishing, etc., without changing a gear. The construction of the tailstock, which is of the curved under type, is heavy and rigid. There are T slots in the carriage for clamping work for boring and milling and the carriage can be locked when the cross feed is being used. The saddle has long bearings on the ways and the bridge is wide and stiff. The lathe will cut the regular numbers of threads from 4 to 40 and the cross feed screw has a micrometer graduated collar. The compound rest is graduated in degrees and the spindle has a 1 5/16-in. hole through its entire length. The equipment of the lathe includes large and small faceplates, two steel centers, plain, follower and steady rests, change gears for screw cutting, the necessary wrenches and a countershaft.

As will be noticed from Fig. 2 which shows the 16-in. gap lathe, the bed is reinforced at the gap so as to give additional strength. The gap on this size of lathe is 4 in. deep, which increases the swing 8 in. and the width of the gap is 8½ in. A bridge is furnished which fits into the gap, thus closing it so that the tool can be used as a straight bed lathe for general work. When large swing work is to be machined the bridge can be removed in a short time. This bridge is scraped and fitted in the gap and is located by dowel pins, four bolts holding it in place. In addition to the 16-in. size this lathe can be furnished with swings of 11, 12, 13 and 18 in.

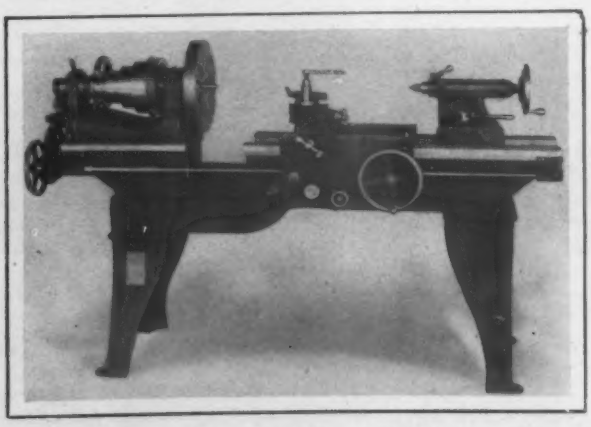


Fig. 2—The 16-In. Gap Lathe with a 6-Ft. Bed

Electrical Engineers Ask Patent Commission

The American Institute of Electrical Engineers, of which Ralph D. Mershon is president and F. L. Hutchinson is secretary, adopted through its board of directors, November 8 the following resolutions concerning the United States patent system:

Whereas, There are pending before the Congress numerous bills affecting and greatly modifying the patent system in the United States, and

Whereas, The patent system has been and is a tremendous factor in building up the present industrial prosperity of this country, thereby greatly contributing to the prosperity of the country as a whole, and

Whereas, Any untoward change in the patent situation might disastrously affect this condition of industrial and general prosperity and the conditions contributing to their continual augmentation, and

Whereas, In view of the intimate relation of the patent system to the general welfare, no action looking toward any radical change in the patent system should be taken without most careful consideration, and

Whereas, In our opinion, proper consideration of such important changes as are proposed can be had only by an unbiased non-partisan commission, made up of men from various walks of life and not from any one vocation or interest,

Be It Resolved, That the American Institute of Electrical Engineers, acting through its officers and board of directors, respectfully urge the Congress of the United States that they provide for a commission, made up of unbiased, independent, non-partisan men of such national standing as will command the respect of the whole country; and chosen from different walks of life; and not more than one from any one calling or interest; and serving without pay. Such commission to hold public hearings, and otherwise, as may appear to them best, to make a thorough and careful study of the American patent situation, and to prepare and submit a comprehensive report and recommendations to Congress for such changes, if any, as may, as the result of their study, appear to them expedient, whether in the Patent Office, in the method of court procedure, or in the organic patent law, and recommendations as to the legislation they would propose for effecting said changes. And that we further respectfully urge that the Congress make ample provision for the expenses of said commission and

Be It Resolved, That we respectfully urge the Congress of the United States to hold in abeyance all proposed legislation affecting the patent system in whatsoever way until such time as the said commission shall have had ample opportunity to hold the said hearings, and make the said study and report, and

Be It Further Resolved, That these resolutions be printed and a copy be sent to each Senator and Representative of the United States who is a member of the Senate or House Committee on Patents.

The revision of our patent laws is a matter requiring careful regard for all interests and it demands the consideration of experts and of those who have specialized in this field. It would seem to be an eminently proper subject to be handled by a commission, but a time limit should be specified for the submission of its report.

Independent Pneumatic Tool Company

The annual meeting of the board of directors of the Independent Pneumatic Tool Company was held in Chicago December 3. The usual quarterly dividend of 2½ per cent. was declared payable January 10, 1913, to stockholders of record on December 31, 1912. The annual statement shows an increase in the company's sales of 31 per cent. over the previous year. In order to meet the increased demand for Thor air tools, additional factory buildings are now under construction at Aurora, Ill., which, with equipment, will cost several hundred thousand dollars. James Buchanan Brady, president of the company, made a special trip from New York to Chicago to attend this meeting.

Practicability of the Hadfield System

Sir Robert A. Hadfield, London, England, calls attention to the fact that in the discussion of his recent papers on sound steel presented before the Iron and Steel Institute some of those who are contributing remarks appear to be under the impression that the methods he described relate to experimental ingots. Among other references to this question is that made by Benjamin Talbot in New York, on November 7, as published in *The Iron Age* of November 14, in which he said:

> Others, among whom is Sir Robert Hadfield, suggest the use of a sink head to avoid the pipe which forms by the shrinkage of metal from its liquid to its solid state. To do this effectively, some system of keeping the surface fluid must be adopted. There is no doubt that if this is carried out the sink head will feed the ingot and the cavity will be in the head. The question to be decided with this method is whether it is commercially applicable to the large output required from a modern rail mill.

The Hadfield system, we are advised, has already been commercially applied to an output of something like 15,000 tons of ordinary and special steel ingots, without, as far as known, a single waster from unsoundness or segregation. This output clearly cannot be called a small one, and the results accomplished certainly appear to be most important as showing the high quality of the product and that the system can be applied on the largest scale, such as that of a modern rail mill. On this tonnage of ingots made there was probably a saving of at least 1000 tons of raw material, and in certain kinds of special steel there was a saving of nearly 20 per cent. as compared with ingots made in the ordinary way. Sir Robert has issued a pamphlet, No. L.5812 U.S.-C., in which he presents drawings showing the arrangement of a plant of good size according to his system, which is a practical suggestion as to how it can be used for the production of sound steel in large quantities.

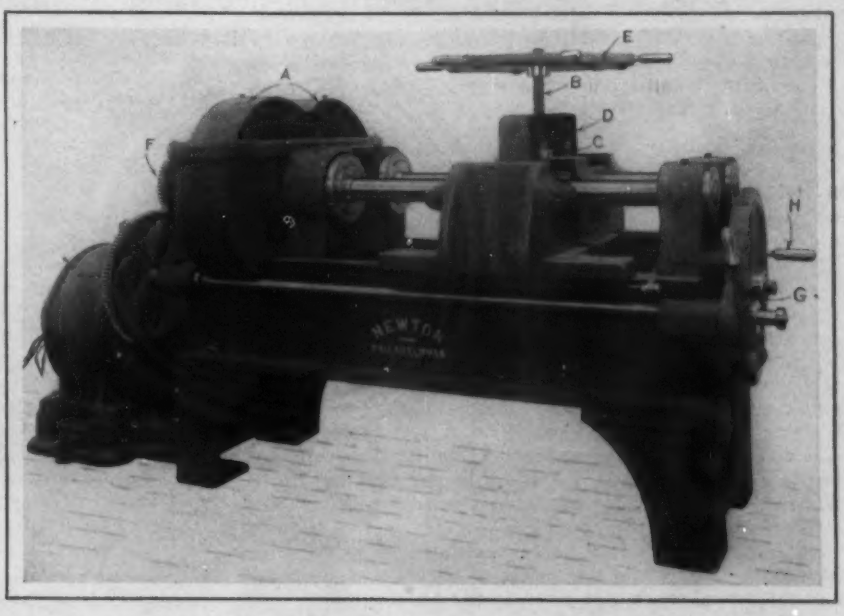
Sir Robert states that Mr. Talbot's remarks, as above quoted, seem to imply that his system depends for its efficiency entirely on the use of a sink head. A careful reading of his papers to the Iron and Steel Institute would show that there is much more than this; that, in fact, the sink head in one sense is to some extent secondary. He emphasizes that his method consists in a sand head, insulating layer of slag, charcoal and blast. This, it will be seen, is very different from merely attaching a sink head to the ingot, which is not only an old method but one that is too uncertain to attain the desired objects, namely, to improve the quality, avoid segregation and stop the present large waste in discard.

Representative Prouty, of Iowa, has introduced a bill in Congress to relieve car shortage. It provides that railroads shall require consignees to unload freight in five days, demurrage or no demurrage, and if a railroad does not enforce the rule it shall be liable in damages to persons ordering cars and not receiving them. All shippers ordering cars who do not load them within 48 hours shall be notified by the railroad that unless they are loaded within three days the cars may be delivered to another shipper.

The H. W. Johns-Manville Company, Madison avenue and Forty-first street, New York, announces the appointment of C. S. Berry as manager of its new branch house in Atlanta, Ga. This branch not only carries a full stock but also employs a force of workmen experienced in the application of J-M products.

A High-Duty Double-Spindle Box Boring Machine

To meet the demand for a box boring machine giving an output proportionate to that obtained on high-duty machines or various other metal working machines, the Newton Machine Tool Works, Inc., Twenty-fourth and Vine streets, Philadelphia, Pa., is building a high-duty double-spindle machine. The machine is designed along the lines of high strength, and conforms with the ideas of safety in operation, having all the dangerous gears covered. The machine has flexibility as regards sizes of boxes bored and to accomplish this, the boring bars, which are fitted with slots for boring, facing or chamfering tools, are threaded to the spindle, thus permitting the use of various diameters of bars.



A New High Duty Box Boring Machine with Two Spindles Built by the Newton Machine Tool Works, Inc., Philadelphia, Pa.

Motion is transmitted by a 7½-hp. motor through an intermediate steel spur gear to two large diameter broad-face spindle driving gears inclosed at A in the accompanying illustration. The spindle head is cast integral with the base, each spindle having a bearing on each side of the driving gears. The rear one is straight, while that in front is of the double taper type with renewable bushings. The outer ends of the boring bars are journaled in renewable taper bearing bushings having adjusting nuts to compensate for wear.

In operation, the boxes to be bored are held in a horizontal position by means of a vertical clamp carried on the saddle. The screw of the clamp B has a vertical floating fit in the saddle for a distance of ½ in. and is prevented from falling below the neutral position by a collar located at C. The clamping yoke D and the corresponding yoke at the bottom are actuated by right and left hand screws and the screw B and are controlled by the handwheel E.

The available cutting speeds range from 40 to 80 ft. per minute with a feed of 1/16 in. per revolution. Motion for the feed is taken from the driving spindles by gears at F, carried to the opposite end of the machine, where a clutch, G, is provided. This arrangement also permits of a hand adjustment by the wheel H, which is fitted to the feed screw.

The machine is compact and rigid, the bed being exceptionally heavy. The saddle has a full bearing on the gibs and adjustments for wear are made by taper shoes. The weight of the machine is 7825 lb. and the floor space including the motor bracket, which is securely bolted to the base at the driving end, measures 4 x 10 ft.

The two additional buildings for the manufacture of wire to be made to the plant of the Halcomb Steel Company, Syracuse, N. Y., are nearing completion, and it is expected that they will be equipped and ready for operation about the middle of January.

American Society of Mechanical Engineers

Management and a New Method of Time Study, Machine Shop Practice and European Gas Power Developments Subjects of Annual Meeting

The meeting of the American Society of Mechanical Engineers held last week in New York City, in the Engineering Societies Building, contributed heavily to mechanical engineering knowledge in a number of directions. It devoted about five hours to the subject of industrial management and this fact is significant in view of an attitude that scientific management is failing in its promises. The attendance was larger than for any other professional session, and a record-breaking number of requests to discuss the subject having been received, it became necessary to adjourn for luncheon, splitting the session into two parts, and all in all it seemed clear that management was finding itself as a rational subject for more than superficial or spasmodic attention by the society. Others of the professional sessions were likewise noteworthy. A remarkable report was received on the present practices and tendencies in gas engine construction and operation, in gas producer work and in the utilization of gas power generally. A comprehensive review of 10 years' developments in the machine shop was contributed; a paper calculated to bring case-hardening of steel into the realms of science was presented and a personal touch was given to the activities surrounding the introduction of the Bessemer process of steel making in this country by Capt. Robert W. Hunt in his acceptance of the John Fritz medal for 1912.

The meeting this year was quite different from other annual meetings of recent years in respect to entertainment arrangements. Instead of the lecture on Wednesday evening of the meeting week, usually of a semi-popular but none the less highly interesting and informing character, the function this year took the form of a dinner to Prof. John E. Sweet, in commemoration of his personal achievements, his activities in organizing the society and his recently completed eighty years of a useful life. The reunion, reception and dance, commonly occurring on Thursday of the meeting week, was this year replaced by a joint reception conducted by the four large national engineering societies, following the presentation to Captain Hunt of the John Fritz medal. Both social features were well attended and apparently popular. An extended and elaborate series of visits had been arranged to plants and points of engineering interest, and the usual luncheons and afternoon receptions for ladies were provided with the departure this year that most of these were made self-supporting by requiring the participants to purchase tickets as contrasted with a former practice of financing these arrangements through contributions from New York members. What the concensus of opinion regarding the change is has not yet been gauged.

As already announced in these columns, the contributions to different branches of mechanical engineering were in sufficient number to require simultaneous sessions, and on Wednesday morning, December 4, separate meetings were held to discuss power plant subjects; questions peculiar to the textile industry, and the problems of gas power, the last held by the Gas Power Section of the society. Similarly on Thursday morning there was a machine shop meeting, a railroad mechanical engineering meeting, and a cement mechanical engineering meeting. The opening session, Tuesday evening, December 3, at which the annual presidential address was delivered by Dr. Alexander C. Humphreys, was reported in the last issue. On Wednesday morning a general business section was held previous to the convening of the three simultaneous sessions; on Wednesday afternoon was held a meeting to consider committee reports—in particular, a report on power tests; on Thursday afternoon there was a session on fluid flow, and on Friday morning, continued into the afternoon, was the final session of the meeting, the session given over to matters of administration.

Activities of the Society

The business session on Wednesday morning received the report of the Council, which was read by the secretary, Calvin W. Rice, and the reports of various committees. The reports are now obtainable in full in the December Journal of the Society. The new activities included the appointment of a committee on increase of membership which has been signally successful as noted by President Humphreys in his address. A ballot is shortly to be sent to the membership to vote on providing an additional engineering grade of membership known as that of associate-member, intermediate between that of member and junior, and also on substituting election of members by the Council for election by the membership at large. Sub-committees to the committee on meetings have now been appointed to the number of ten, covering administration, air machinery, cement manufacture, fire protection, hoisting and conveying, industrial building, iron and steel, machine shop practice, railroads and textiles. A special committee on a code of ethics has been appointed. A committee has also been appointed to prescribe the permissible tolerances in the commercial manufacture of taps, bolts and screws including their measurements. Finally it may be added that the society's income last year was over $112,500.

The report of the Research Committee stated that papers on the following subjects are in preparation: The present status of the railroad rail question; the deterioration or growth of cast iron in an atmosphere of superheated steam; the effect of pulsating flow on the accuracy of flow meters; steam heating of towns from central stations, and the amount of air and other gases in injection water.

The Meeting of the Gas Power Section

The striking feature of the meeting of the Gas Power Section, held Wednesday morning immediately after the business session, was the address of the retiring chairman of the section, H. J. K. Freyn, consulting engineer, Allis-Chalmers Company, West Allis, Wis., on the "Recent Development of Gas Power in Europe." This address will be found probably in the next issue. It brought out an active discussion as did also a paper presented before this section by Irving C. Allen, of the experimental station of the Bureau of Mines at Pittsburgh, of the Department of the Interior, entitled "The Use of Heavy Oils in Internal Combustion Engines." Mr. Haynie, Olds Motor Company, thought that Mr. Freyn's reference to the fact that the cost of gas engine building had been higher than estimated was misleading in that a similar experience was usual in the development of new things, as was the case with the steam turbine. He emphasized the value of the Diesel engine in that the fuel consumption in it is constant over a wide range of load and he suggested that the reason that the Diesel engine was not more widely used in America was that those in control of the patent situation did not take the right steps to help in the development. Much depended for successful operation on the condition of the oil on delivery into the cylinder. The smaller the particles or globules of oil, the greater the surface favoring the rapid combustion which is nearly instantaneous.

Prof. Wm. T. Magruder, professor of mechanical engineering, Ohio State University, Columbus, Ohio, told of his observations made in a visit to Europe this year. He gave credit to the developments in Europe to consulting engineers who are also professors in technical schools and to the fact that the engineering associations have taken a deep practical interest in the subject. He felt that it was high time that societies in this country traveled along the same lines, and that more was done in research lines; that there was too much secretiveness and apathy in this country. He had found that 800-hp. gas producers and even 500-hp. producers had been developed to give reliable serv-

ice where formerly 1500-hp. was the minimum size commercially satisfactory.

The Need of a New Engine Fuel

Prof. Magruder attempted an interesting analysis of the demand for gasoline in terms of the available supply. On the basis of 1,000,000 motor cars and the same number of motor boat motors, with the average power of the former 25 hp. and the latter, 10 hp., the total rated capacity of motors using gasoline is 35,000,000 hp. With a consumption of 1 pint of gasoline per horse-power-hour, all the motors operating 1 hr. at full load would require 4,500,000 gal. of gasoline. As there are 1,500,000,000 gal. of gasoline available, the total supply would not last more than 330 hr., or about 5 per cent. of the total engine capacity could be used continuously at rated load. This fact he pointed out shows the need of another fuel, such as a wider use of kerosene, which is now relatively a drug on the market.

As indicating the constancy of the rate of fuel consumption over a range of loads, Prof. Magruder mentioned figures he obtained in Europe as follows, for the number of pounds of oil used per brake horse-power; full load, 0.44 lb.; three-fourths load, 0.45 lb.; one-half load, 0.47 lb.; one-fourth load, 0.62 lb. He considered that the Diesel engine "must come" in this country.

Mr. Allen, in his paper, reported that of "gas oil" (the portion of the oil the specific gravity of which lies between those of the heavy naphthas or kerosenes and the light spindle oils) over 8,600,000 bbl. could have been produced from the oil produced in the United States in 1911. As approximately 0.4 lb. of oil similar to gas oil will produce 1 hp. when burned in a heavy-oil engine, the production of gas oil from the petroleum fields in 1911 would alone develop over 6 1/3 billion horsepower-hours, without in any way interfering with the uses of the other petroleum products now manufactured.

He submitted in detail the specifications that an oil should meet to burn with success in heavy-oil engines, and also the specifications for lubricating oils for use in cylinders and pumps. The heavy-oil engine, he added, cannot as yet be considered fully developed, for much work is yet to be done to bring it up to that point of development of which it is capable, but the fact that petroleum containing as high as 20 per cent. asphaltum and that oils from tars have been successfully used, is most encouraging. The future of the heavy-oil engine is assured. Better and more extensive uses for coal by-product liquid fuels are being developed, and, what is of great importance to the petroleum industry of the United States, there is being developed a better use for the heavy asphaltum liquid fuels and the cheap gas oils produced in such large quantities in this country.

The Case of the Alcohol Engine

It was suggested in the discussion that more emphasis might well be placed on the development of the alcohol engine. It ought to be possible through the medium of vegetable growth to secure the carbon dioxide of the atmosphere and the water available in rain and otherwise together with the heat energy of the sun to obtain alcohol fuel to supplement oil fuel, but it was also pointed out that such methods and the manufacture of alcohol from molasses and waste products would, after all, not be productive of large amounts of fuel in proportion to the heavy demands. It is also to be remembered that farm lands are already actively cultivated. The throttling of trade in alcohol through the commercial interests of oil handlers was claimed to be one of the causes of the lack of use of the alcohol engine, not to mention the federal tax on alcohol.

Charles Whiting Baker, editor Engineering News, thought more attention might well be paid to the utilization of tar oil. He said that 700 lb. of tar oil contain as much energy available for the Diesel engine as the amount of coal, from which it could be obtained, would have when burned in the steam boiler, with the added advantage that the residue after obtaining the tar oil would be a smokeless fuel. It was brought out that ordinarily there are 10 gal. of tar oil obtained per ton of coal and with special distillation as much as 12 gal. could be obtained. Mr. Baker suggested, however, that no effort is made in gas works to obtain tar as it is the last thing wanted in gas works.

Officers of Gas Power Section

The Gas Power Section was opened with the announcement of the unanimous election of Prof. F. R. Hutton as chairman of the section and the following as members of the executive committee: Prof. Wm. D. Ennis, professor mechanical engineering, Polytechnic Institute of Brooklyn; Wm. H. Blauvelt, consulting engineer, Semet-Solvay Company, Syracuse; and Mr. Freyn and Prof. C. H. Benjamin, dean of the school of engineering, Purdue University, Lafayette, Ind. Prof. Hutton in accepting the office expressed his pleasure in accepting the chairmanship at a time when the modifications of the constitution are suggested for puting the control of the section largely in the power of its own executive committee.

Meeting of the Power Plant Session

Dimensions of Boiler Chimneys for Crude Oil

The first paper presented at the power plant session was read by Prof. D. S. Jacobus in the absence of the author, C. R. Weymouth, chief engineer, Charles D. Moore & Co., engineers, San Francisco, Cal. The author recommended the use of lower chimneys than was customary, especially where the plants were not subject to overload, as affording a means of chimney regulation of fuel economy. Errors in the previously accepted formulas for variation of chimney proportion for operation at different altitudes were pointed out. Data regarding the frictional resistance of fuel economizers and a table showing the ratio of reduction of chimney capacity due to the cooling of gases within the economizer and the resistance of the economizer were presented together with dimensions of steel chimneys for minimum first cost and the selection of a type of chimney suitable for quick starting reserve plants was discussed.

Prof. Wm. Kent cited the case of a test he had made with boilers having four oil burners and forced draft where the boilers smoked because of the improper distribution of air. He stated that separate burners with separate flues would render rapid analysis of the flue gas possible and said that 3 per cent. of oxygen was an ideal condition for combustion. E. H. Peabody, marine department, Babcock & Wilcox Company, mentioned two burners operated one with insufficient and the other with an excess air supply and stated that the results were satisfactory. The air supply could, in his opinion, be regulated and the furnace could be designed so as to take care of this feature.

Water-Tube Boiler 24 Tubes High

A paper on tests of a 1000-hp. boiler 24 tubes high, which appeared substantially in full in *The Iron Age* of November 7, was presented by its author B. N. Bump, engineer of tests, Solvay Process Company, Syracuse, N. Y. In opening the discussion, Prof. W. D. Ennis, stated that the results of the tests do not apparently harmonize with the principles generally accepted, a 3 or 3½-lb. rate of evaporation being generally considered as that of maximum efficiency, while in this boiler the efficiency suddenly decreased as the rating increased and the best efficiency was reached at the evaporation rate below 2 lb. In this boiler with its unusual ratio of heating surface to grate surface, low rates of evaporation were not accompanied by low rates of combustion, and as large a heating surface as was provided should have, in the speaker's opinion, more completely absorbed the furnace heat. The flue gas temperatures at various percentages of the rating were unusually good. The difference between the efficiency of half load and full load meant an extra coal consumption at full load of about 0.05 lb. per horse-power-hour. To offset this waste a duplicate equipment would cost initially $20 per horse power but the saving of 0.2 ton of coal a year, which would be the maximum amount possible, would usually not pay the fixed charges on this investment.

Professor Kent attributed the maximum efficiency at low rating to the excellent covering and stated that the

analysis for CO_2 was not sufficient to account for the decrease of efficiency and one of oxygen should also be made. The air supply in his opinion caused poor results and the arrangement of this supply was an important feature. James H. Browne, mechanical engineer, Richard D. Kimball Company, New York, discussed the method of baffling the boiler. He had seen in a boiler baffled with asbestos board, where the trouble was caused by the creeping of the tubes. In his opinion the area of grate surface might be changed to give the maximum efficiency at an 80 per cent. rating. The tendency of firemen in general was to have too much air and an automatic control would do away with the regulation of the air supply by the fireman. Faster flow of air might have tended to give better results and a case was cited where an economy of 77 per cent. was obtained at a temperature of 3000 deg.

Other Power Plant Papers

Among the other papers presented before the power plant session was one by George A. Orrok, mechanical engineer, New York Edison Company, giving the results of his investigations on the amount of air present in feed water and the effect of air in surface condensers. An apparatus for measuring the air leakage was also described.

Experiments with North Dakota lignite in a steam power plant and a gas producer were reported in a paper by Prof. Calvin H. Crouch, dean of the College of Mechanical and Electrical Engineering, University of North Dakota, Grand Forks, N. D. The paper in full is printed in the December Journal of the society.

At the textile session held also on Wednesday morning a paper was presented by John A. Stevens, consulting engineer, Lowell, Mass., describing the purposes that should be served by power plants in textile mills. This paper is also to be found in the society's December Journal.

Codes for Testing Power Plant Apparatus

A part of the ambitious programme which the society is following is a revision and extension of the present testing codes of the society relating to power plant apparatus. For this purpose, a committee was appointed over two years ago and on the Wednesday afternoon session a preliminary report of no less than 188 pages was presented. This covered in separate sections the procedure to take in testing boilers, steam engines, steam turbines, pumping machinery, compressors, fans, locomotives, gas producers, gas engines, water wheels, etc., and also general suggestions and instructions covering the matters of desirable scope of data, character of records, rules for sampling coal, ash and steam and several miscellaneous matters. An active discussion followed the presentation of the report which was submitted by Professor Jacobus, chairman of the committee for George H. Barrus, consulting engineer, Boston, vice-chairman of the committee, who drew up the preliminary report. The discussion had practically all to do with changes or modifications which it was felt the committee ought to make in revision, before submitting the final report.

Col. E. D. Meier, president Heine Safety Boiler Company, suggested the advisability of having the committee continued as a permanent commission or board of reference to which questions on testing apparatus and methods could be submitted for its adjudication. Albert A. Cary, consulting engineer, New York City, discussed at some length his ideas of rational gas analysis, the location of gas sampling pipes, the importance of both boiler and furnace efficiencies, the question of studying fuel combustion on the basis of the fixed carbon burned per unit of grate area and the possibility of continuous satisfactory determination of smoke, all along the lines of a series of articles he recently contributed to *The Iron Age*, beginning in the issue of October 10.

Among others who discussed the report were Charles D. Young, engineer of tests, Pennsylvania Railroad, Altoona, Pa., Prof. F. R. Hutton, consulting engineer, Department of Water, Gas and Electricity, New York City; Alfred B. Carhart, superintendent, Crosby Steam Gage & Supply Company, Boston; Willis H. Carrier, chief engineer Buffalo Forge Company, Buffalo, N. Y.; Prof. W. D. Ennis, professor of mechanical engineering, Polytechnic Institute of Brooklyn; Dr. W. F. M. Goss, University of Illinois, and C. M. Garland, Camden Iron Works, Camden, N. J.

Standard Flanged Fittings and Valves

The report of the committee on standard flanged valves and fittings, H. G. Stott, superintendent of motor power of the Interborough Rapid Transit Company, chairman, was interesting in its statement that the so-called 1912 U. S. Standard, which has already been referred to in these columns, is to be extended to cover diameters from 30 to 100 in. and that co-operation is expected with the American Water Works Association and the New England Water Works Association, as well as the National Association of Steam and Hot Water Fitters. The high-pressure work is to be carried up to 48 in. diameter and the low-pressure, for pressures up to 125 lb., to 100 in. Mr. Stott stated that 89 manufacturers and 25 dealers were prepared to furnish the 1912 standard, though the intimation was that, in some cases at least, a special charge for such fittings would be made. Some objection was made to any publication of the names of the manufacturers and dealers for the reason that the names of some large manufacturers are not on the list or that some names are there with the understanding that they will supply the standard only at a high price.

The Session on Machine Shop Topics

Ten Years' Developments in the Machine Shop

One of the sessions of Thursday morning, December 5, was given over to the sub-committee on machine shop practice, Fred E. Rogers, editor of Machinery, chairman. The meeting was opened with an interesting report of the committee on the "Developments in Machine Shop Practice During the Last Decade." Space allowing, it is planned to print a large portion of the report in this issue.

Efficient Production of Cylindrical Work

An illuminating paper on "Efficient Production of Cylindrical Work," was presented by C. H. Norton, of the Norton Grinding Company, Worcester, Mass., who desired to emphasize that the modern grinding machine was not developed to introduce an additional operation to turning, but to make cylindrical work less expensive than formerly. In fact, he brought out that it was often profitable to increase the time given to the grinding operations and less to the turning. The paper was submitted as covering the result of 12 years of experiment. The lathe is expected to take off a large cut, leaving something still to be ground off, the grinding machine preferably accepting work in the rough condition and not at all in the smooth condition which would tend still to give the impression that the grinding operation is merely a finishing one. Richard H. Rice, General Electric Company, West Lynn, Mass., regarded one suggestion of the author as particularly valuable, that of making one department out of the lathe and grinding departments.

Strength of Gear Teeth

A paper on the strength of gear teeth was submitted by Prof. Guido H. Marx, professor of machine design, Leland Stanford, Jr., University, which paper was regarded as rather startling in that it questioned the long accepted Lewis formula. There was some hope expressed that the author would find his way clear to continue the experiments, particularly on larger size gears and it was also held that the results were possibly rather theoretical than practical, a view which seemed to be borne out by the fact that the fractures shown were generally not of the kind met with in practice where corners of teeth are broken rather than the tooth being broken off in a plane parallel to elements of the root. Those entering the discussion included Luther D. Burlingame, Brown & Sharpe Mfg. Company, Providence; Ralph E. Flanders, engineer The Fellows Gear Shaper Company, Springfield, Vt.; Prof. William Kent; C. H. Norton; Prof. Wm. H. Marshall, Sheffield Scientific School, Yale University, and Prof. T. M. Phetteplace, Brown University, Providence.

The Art of Industrial Management

The last session of the meeting, Friday morning, December 6, was the star session of the meeting in point of attendance and activity of discussion. For it was reserved a report of the society's sub-committee on administration, James M. Dodge, chairman. No time was taken for the presentation of the report, which had been in print for some weeks, but the discussion was not completed at luncheon time and the session had to be adjourned to the afternoon. Part of the report follows, together with a brief review of the discussion:

Transference of Skill

The basic principle in the rise of industry is the *transference of skill.* The transference of skill from the inventor or designer to the power-driven mechanism brought about the industrial revolution from handicraft to manufacture. No better single illustration of the application of this principle can be found than in the invention of the lathe slide rest by Henry Maudsley in 1794. This has been ranked as second only to the steam engine in its influence on machinery building, and thus on industrial development. The simple, easily controlled mechanical movements of the slide rest were substituted for the skilful human control of hand tools. So complete has been this transference of skill that today hand tooling is a vanished art in American machine shops. Very few lathe hands can chase a thread with hand tools, yet all can cut good threads on an engine lathe, thanks to the slide rest.

The place of greatest advance has been in the drawing room. The art of machine design has been greatly developed. The last half of the last century saw a tremendous increase in inventions, a tremendous furtherance of the application of transference of skill to machines and tools. The skeleton of an industrial organization of this period, one that was too large for a single executive to manage, consisted of a designing department and a production department, each with a head responsible to the manager.

The first of these, the one that was the means of embodying skill in the machinery and tools of production, was highly developed and organized. Experiment, research and detailed study were constantly resorted to, to aid in reaching the desired result. The work was highly specialized and the employees highly paid. Not infrequently the manager or chief executive devoted much of his own time to this part of the business.

The production department presented a contrasting condition. The workmen were given the tools and machines designed in the drawing room and using their own unaided skill were expected to produce work of the desired quality and quantity. Except in rare instances no effort was made to transfer the skill of the management to the production department and the employees, or to undertake the division of executive thought. Very little consideration was given to the workmen as a producing unit.

Changes in Attitude of Production Managers

Within the past 20 or 25 years certain changes have taken place in the attitude of many production managers towards the problems that they face and the forces and means that they control. An increasing amount of attention is being given to the worker. An early evidence was the development of profit-sharing, premium and bonus systems to reward increased effort and output. There followed welfare work, industrial betterment movements, the adoption of safeguards and regulations to minimize industrial accidents, the substitution of the principle of accident compensation for employers' liability and an improvement in the physical surroundings and conditions of factories. All of these tendencies have been fostered and to a great extent initiated by employers. But even to-day these are by no means generally adopted.

Another tendency, less pronounced in character, has as its object the improvement of the personal relations between employee and employee and between employee and employer. It is an effort to establish the best of factory working conditions in those things not physical in nature, to develop and maintain a shop atmosphere free from all harassing and hindering influences. It is an attempt to make use of the results of experimental psychology, in improving working conditions.

But the most important change and one that comprehends the others, is in the mental attitude toward the problems of production. The tendency is toward an attitude of questioning, of research, of careful investigation of everything affecting the problems in hand, of seeking for exact knowledge and then shaping action on the discovered facts. It has developed the use of time study and motion study as instruments for investigation, and the planning department as an agency to put into practice the conclusions drawn from the results of research, and methods of wage payment which stimulate co-operation.

Labor-Saving Management

During the development of popular interest in the subject, the term "scientific management" has been generally and loosely applied to the new system and methods. This is commonly taken to mean that there is a science rather than an art of management. A truer interpretation is that it means management using scientific methods, these being taken largely from the sciences of physics and psychology.

The expression "labor-saving management" better conveys the meaning of the movement. It has the further advantage of being easily and surely understood because of its strict analogy with the term "labor-saving machinery." It is no chance that puts these two terms, labor-saving machinery and labor-saving management, in conjunction, for the first is the past development and the second the present trend of industry, and they will be closely and inevitably associated in the successful manufacturing of the future. In the report the terms "industrial management" and "labor-saving management" are used, the first to denote the subject broadly, the second the newer attitude.

The basic principle of the transference of skill is put into effect on the management side of all industrial activities through three regulative principles: (*a*) the systematic use of experience; (*b*) the economic control of effort; (*c*) the promotion of personal effectiveness.

First Things in the Practice of Management

The labor-saving management springs from a change in mental attitude, the beginning of its practice should be with the persons having the final responsibility, the proprietors of closely-owned businesses, the directors of larger establishments, or the officials having charge of Government works.

A similar mental attitude must be fostered among all the members of the executive force and a period of training for them begun. This may include a redistribution of function and responsibility, and will include a detailed study of production by scientific methods. This is the period of division of thought, training of the management staff and setting-up standards of performance. This must be carefully performed before there can be effective transference of skill to the workers in the production departments.

The usual conception of modern management is that it affects the workmen most of all, tending to stimulate them to turn out increased production to their possible hurt. This is wrong. If the principles outlined are followed, the executive, or non-producing labor is most affected. Its individuals are compelled to study, plan and direct. They must acquire knowledge and skill in order to transfer it. It is a system of management that forces the executives to manage.

This being so, the introduction of modern management in a plant must be made slowly. The causes of most so-called failures are principally two: a failure of the executives to acquire the vital mental attitude and too great haste in application. The latter seems to be the dominant one. Your committee feels compelled to emphasize the danger of attempting to hurry any change in methods of management. Each step of the work should be made permanent before the next is begun.

Broad Results of Labor-Saving Management

In cases where the use of labor-saving management can be considered a success, the broad results have been: a reduced cost of product; greater promptness in delivery with the ability to set and meet dates of shipment; a greater output per worker per day with increased wages, and an improvement in the contentment of the workers. This last item is shown by the fewness of strikes under

(*Continued on page* 1407)

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Relative Production of Pig Iron and Steel

The fact that last year the United States produced a slightly larger tonnage of steel ingots and castings than of pig iron naturally attracted some attention. The condition promises to be more or less permanent, for current estimates indicate that at the present time the "production of steel" is measurably exceeding the production of pig iron. As is probably well recognized in interested quarters, what is given as "the production of steel" is simply that of steel ingots and castings, there being large losses, subsequently recovered, between the steel ingot and the merchantable rolled steel. A large tonnage of pig iron is consumed in the manufacture of castings, so that the tonnage of pig iron used in making steel is much less than the total tonnage of pig iron produced.

It is not the case that the great difference between the amount of pig iron consumed in making steel and the amount of steel ingots and castings produced is made up chiefly by the use of old material in steel making. Much more than half the total scrap so consumed is new scrap, largely material which has never left the works in which it is produced. Were the difference made up largely by the use of old material, we should naturally expect to find the production of steel larger, in proportion to pig iron, in the older iron countries, and those which were large producers long ago. If, for argument, material comes back as scrap after an interval of 15 years, then the present supply of scrap in the United States is proportioned to the production of 15 years ago, and our production then was a smaller percentage of the present production than is the case with any other important iron making country.

The United States is among the newest of the iron-making countries, yet we find that while here the production of steel ingots and castings slightly exceeds the production of pig iron, the rule does not hold good with the world in general. Complete statistics of the world's production in 1910, recently gathered by James M. Swank, show 65,835,000 tons of pig iron produced, but only 60,458,000 tons of steel. England, the oldest of the great iron producing countries, and the one which ought to be originating the largest amount of scrap at this time, produced 10,012,098 tons of pig iron and only 6,541,000 tons of steel. A part of this large difference is due, of course, to England's large exports of pig iron, yet the conclusion is inevitable that in general the United States is running proportionately more to steel products and less to iron castings, than is the case with other countries.

Public Service for Business Men

The carnival of class legislation, as one of the speakers at the recent New York convention of the National Founders' Association termed the performance of the last session of Congress, will not be without its advantage. It is calculated to arouse in business men a deeper interest in national affairs, for there is no denying that the profits of industry will be affected by the programme of labor measures in which so considerable a beginning has been made by the present Congress.

The average manufacturer is too prone to rivet his attention on things in his immediate sphere. With some types of legislators he is out of sympathy and too often he takes only passing interest in the activities of

the government. It should not take many demonstrations like that of the past year at Washington to arouse individual manufacturers to the need of a new course of action. Too much dependence has been put upon the work of paid representatives of manufacturers' associations. It has been good work, zealously done, but its great drawback has been that it has confirmed many members of these associations in abstention from contact with the men who make laws for them. Manufacturers have thus lost much that would naturally result from the cultivation of acquaintance with their representatives in Congress and in State legislatures.

What has impressed itself with more force than ever upon manufacturers who have been in Washington in the past year of many hearings is the almost negligible number of business men in Congress. It may be a question how far a retired employer could get a standing in politics in a day when malefactor and manufacturer are often bandied without particular discrimination. But business men reaching retirement in the early fifties, as an increasing number are doing, could exert an influence beyond calculation by taking a hand in the working out of industrial questions. A measure of aloofness from the struggle would make them fairer and thus should add weight to their position.

What is increasingly evident in the new adjustments of labor and economic issues is the tendency to prejudge the case of the employer. Labor has no lack of friends at court, but there is a woeful lack of understanding among legislators of the lines on which modern business is conducted and of the uncertainties of profit in many industries. Fair-minded business men, who have the confidence of workmen as well as of employers, are needed in public places, and all the more now, when political issues are so largely questions of economics.

The Viewpoint of the Public

A noteworthy contribution to the current discussion of causes of railroad accidents appeared in the New York Herald of Sunday, December 8. The editor admitted to his department of communications from the people the following amusing gem of thought:

> With the exception of "head ons," "side swipes" and "rear ends," nine-tenths of the railroad accidents are caused by defective iron. There are two reasons for this: The first is the reboiling of "scrap" iron—iron that has become useless and lost its strength—and mixing it with new, and the second is carelessness of employees while running a blast furnace.
>
> The remedy is to prohibit by law the using of scrap iron, and the Government should inspect the output of all blast furnaces before the cast is converted into finished material.

It is unnecessary to give the name attached to the communication as it will hardly be recognized as that of any person of prominence connected with the iron trade. The writer has evidently given very serious and profound consideration to the subject and believes that he has struck the causes of "defective iron," first, the use of scrap, and, second, the faulty operations of blast furnaces. It would be a work of supererogation to attempt to correct the errors into which he has fallen. The communication is merely reproduced here so that our readers can see how curiously mistaken the public can be with regard to steel-making processes. Many persons not connected with the iron trade are even more ignorant than this writer, but it seldom happens that any of them obtain a hearing in the columns of reputable newspapers.

This communication is also an illustration of the attitude of the public regarding matters which concern a considerable number of people. It always seems to be taken for granted that the way to correct any unsatisfactory condition of affairs is to provide regulation by law or to arrange for Government supervision. The Government, in the popular estimation, is a mysterious, all-powerful accumulation of superhuman intelligence, having the faculty of detecting the cause of the trouble whenever anything may be wrong and providing the proper remedy. If the point made by this writer with regard to inspection could be carried out, in its correct application, and a Government representative should be stationed at every steel-making furnace or converter to supervise the process, this inspector would not be a creature endowed with extraordinary attainments but would probably be quite an ordinary person with some little smattering of technical knowledge. It is possible that he would not be nearly so well equipped for testing the quality of the product as the workmen operating the furnace and doing their very best to secure good results. The public can very properly express dissatisfaction and thus stimulate all concerned to greater efforts in the direction of improvement, but the Government should not be dragged in whenever any question of importance is to be settled.

Burden Should Be Watched Closely

The determination of burden at frequent intervals has been of great value in the year now closing to managements of industrial plants having cost systems which make such information available. When no important changes occur in market conditions, burden is more or less a constant factor. But in years like 1912, in which a great improvement has developed, or at a time when unfavorable conditions have made themselves felt, the percentage of burden to productive labor or to the total of labor and materials changes rapidly, and often in a large way, and affects profits to a degree which should be known with exactness. Manufacturers who get at their overhead once or twice a year only are now figuring prices and profits on a basis that was sound at the time of the last inventory but is now far from accurate.

With the improvement of business the percentage of burden falls, and vice versa. If on January 1 last the records of the preceding year showed 100 per cent. burden, today, with the increased volume of product, the percentage may have fallen, say, to 75 per cent., and profits therefore are much larger than is indicated when using the old correction. On the other hand, if the burden has been determined at the close of each month the house always knows exactly how much money it is making. At the time of falling business the management reckons the decreasing profits with confidence in the accuracy of the calculations. It is not manufacturing at a loss without knowing it.

The argument is sometimes made that even when the knowledge exists that profits on manufactured goods have decreased out of proportion to the diminished volume of business, the condition cannot be rectified, for the market will stand no advance in price. It may be argued in the same way that with an increasing demand, if it be known just how much the percentage of profit is advancing, there would be no temptation to lower prices. This is true enough as far as it goes;

nevertheless exact knowledge of costs is always of value in the orderly conduct of a business.

With such an asset the sales department has a distinct advantage. For example, when business is improving a factory may be fairly well filled with orders but would like considerable additional new work. If the records show that the percentage of profit has increased because of the apportionment of burden over a greater production, the sales department might arrange to take a certain amount of business at a lower price. The profit on that particular lot of goods would be less, but the greater output would bring the burden still lower and with it the cost of manufacturing.

A good cost system must include records which would give the overhead at any time. The weakness often is that no method has been developed for getting at this information. When the burden is determined annually the manufacturer cannot know his profits or his losses until the year has come to its end. A guess is his only recourse. If he procures his data semi-annually his period of ignorance is shorter, but it is still too long. In installing or improving a cost system the burden factor should be handled as one of importance equal to that of labor. It is an anomaly to maintain exact records of labor and material without combining an equally intimate knowledge of burden, which sometimes is greater than labor and material combined and approaches their sum in practically every plant.

The Mechanical Engineers' Meeting

The meeting of the American Society of Mechanical Engineers held last week in New York and reported elsewhere in this issue was quite rich in its suggestions of humanitarianism and altruism in commerce and manufacturing. It was a pleasing exhibition to have a detailed report from an employee of a gas engine builder on a wide range of practice, operation and construction matters representing some months of study in Europe. A few years ago generosity of this kind would have been so unlooked for that the recipients would have remained on the defensive or started to look for the ulterior motive. References to the human side of factory operation were also the popular topics in the extended discussion on the art of management. There was no question that the participants in the discussion who were able to contribute from practical experiences in applying science to management were the ones whose observations were best received and then especially when treating of the worker himself. The whole occasion in this respect seemed to be a resounding echo of the spirit of comradeship which served so well, for example, in developing the industries of the country in the times to which Captain Hunt refers in his informing address printed on page 1371 of this issue. It is typified in the note which John Fritz dictated from his bed to Dr. Henry S. Drinker, president of Lehigh University, as follows:

BETHLEHEM, PA., December 5, 1912.

To My Fellow Members of the Four Societies:

I wish to convey to you, through my friend Dr. Drinker, my very hearty greeting, and to express my great pleasure and satisfaction over the award by your committee of the medal bearing my name to my beloved old friend Capt. Robert W. Hunt. No worthier selection could have been made. He is a man so distinguished, so able, so deservedly prominent in the engineering profession, that there can be no question about the wisdom of your choice.

I only wish I could be with you tonight, but my physical condition is not, as yet, such as to permit it. I can, however, thank God for the improvement in my strength and health since my operation last spring, and I hope that I still may have the pleasure of meeting with you all on some future occasion.

Conference on the American Iron and Steel Association's Work

An important conference of iron and steel manufacturers took place on December 9 at the office of the American Iron and Steel Association in Philadelphia. It was attended by E. H. Gary, president American Iron and Steel Institute; Charles M. Schwab, president Bethlehem Steel Company; E. A. S. Clarke, president Lackawanna Steel Company; E. C. Felton, president Pennsylvania Steel Company; Powell Stackhouse, president Cambria Iron Company, and J. G. Butler, Jr., vice-president Brier Hill Steel Company. James M. Swank, general manager American Iron and Steel Association, and James T. McCleary, secretary American Iron and Steel Institute, also participated in the conference. A statement of the conclusions reached relative to the mode of continuing the work of the American Iron and Steel Association will be issued in a few days.

The Steel Corporation's Unfilled Orders

An increase of 258,502 tons is shown by the statement of unfilled orders of the United States Steel Corporation, published December 10. The total was 7,852,883 tons on November 30, compared with 7,594,381 tons on October 31. Below is given the record of unfilled orders as shown at the end of each month since December, 1910, and at the end and middle of each of the preceding years:

November 30, 1912	7,852,883	March 31, 1911	3,447,301
October 31, 1912	7,594,381	February 28, 1911	3,400,543
September 30, 1912	6,551,507	January 31, 1911	3,110,919
August 31, 1912	6,163,375	December 31, 1910	2,674,757
July 31, 1912	5,957,079	June 30, 1910	4,257,794
June 30, 1912	5,807,346	December 31, 1909	5,927,031
May 31, 1912	5,750,983	June 30, 1909	4,057,939
April 30, 1912	5,664,885	December 31, 1908	3,603,527
March 31, 1912	5,304,841	June 30, 1908	3,313,876
February 29, 1912	5,454,200	December 31, 1907	4,624,552
January 31, 1912	5,379,721	June 30, 1907	7,603,878
December 31, 1911	5,084,761	December 31, 1906	8,489,719
November 30, 1911	4,141,955	June 30, 1906	6,809,859
October 31, 1911	3,694,328	December 31, 1905	7,605,086
September 30, 1911	3,611,317	June 30, 1905	4,829,655
August 31, 1911	3,584,085	December 31, 1904	4,696,203
July 31, 1911	3,695,985	June 30, 1904	3,192,277
June 30, 1911	3,361,058	December 31, 1903	3,215,123
May 31, 1911	3,113,187	June 30, 1903	4,666,578
April 30, 1911	3,218,704	December 31, 1902	5,347,523

Tariff Hearings in January

WASHINGTON, D. C., December 12.—The Democratic members of the House Ways and Means Committee yesterday decided to give tariff hearings, beginning January 6 and lasting until January 31. The committee will hold all-day sessions on Mondays, Wednesdays and Fridays of each week, at which will be heard all interested. It has been decided to give hearings on the chemical schedule first, but it has not been decided in what order the other schedules will be taken up. It is believed that precedence will be given to those schedules which the committee at the recent session revised but which revision was ultimately vetoed by President Taft. These include the chemical, metal, woolen, cotton, and sugar schedules. The committee did not decide whether to report a bill or a series of bills.

When the hearings close on January 31, the majority members of the committee will begin the preparation of their bills so that they can be reported, if necessary, either singly or separately, on the first day of the extra session to be called by President-elect Wilson.

Chairman Underwood and other Democratic House leaders believe that the extra session should be called at as early a date as possible. In a formal statement Mr. Underwood says:

I firmly believe, with a number of my Democratic colleagues, that it would be advisable for President Wilson to call the extraordinary session as quickly after March 4 as possible. I have no hesitation to suggest the date to be March 15. In my daily mail are many letters, principally from textile manufacturers, requesting that I give them the best information at my command as to the new schedules for their goods. Of course I can give them no information. They write that they are slowing down in business and hesitate to go ahead because of the uncertainty of the schedules to be adopted in the new tariff bill affecting their goods.

The new tariff bill must first be prepared by the Ways and Means Committee; it must then go to the House for amendments, and subsequently to the Senate, where it may be amended and sent

back to the House, and so on and so forth until it eventually reaches the President for his signature.

If we could convene the extraordinary session on March 15, I could almost guarantee to the business men of the country, in certain circumstances, that the House bill would be in the hands of the Senate on April 15. Of course, if the new tariff bill is to be adopted schedule by schedule, greater celerity could perhaps be attained, and yet there is a difference of opinion on that matter. The House could adopt a number of schedules and they could go over to the Senate. I feel that, with something like unanimous action and unanimity of purpose, the new tariff bill could be adopted and signed by the President certainly not later than July next. The main features of the new bill, without the slightest doubt, will be almost similar, if not identical, with the one we passed and which the President vetoed.

Just as soon as President-elect Wilson returns to the United States from Bermuda, which will be in about 10 days, Chairman Underwood and other leading Democrats will confer with him concerning the legislative programme of the extra session, and at this conference the date of the beginning of the extra session will be fixed. W. L. C.

November Copper Production and Stock

The Copper Producers' Association has issued its monthly statement for November, which makes the following showing as compared with October:

	November. Pounds.	October. Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States at first of the month	76,744,964	63,065,587
Production of marketable copper in the United States from all domestic and foreign sources in the month	134,695,440	145,405,453
Deliveries of marketable copper in the month:		
For domestic consumption	69,369,795	84,104,734
For export	55,906,550	47,621,342
Total deliveries	125,276,345	131,726,076
Stock of marketable copper of all kinds on hand at all points in the United States, at close of the month	86,164,059	76,744,964

The November production shows a decrease as compared with the production in October, but deliveries also decreased. The gain in stock was 9,419,095 lb., considerably less than had been expected.

Promotion of Industrial Education

The annual meeting of the National Society for the Promotion of Industrial Education, held in Philadelphia, Pa., last week, brought together a large number of manufacturers, representative workingmen, educators and publicists. An interesting address was made by Frederick A. Geier, Cincinnati Milling Machine Company, Cincinnati, Ohio, who said that the proposed nation-wide public school system of industrial education discussed at the convention is not local, nor limited to those of any one class. He declared that the industrial fate of this country is largely involved, and this fact will be made plain before many years, when the workers of the United States, through tariff changes, will be brought into keener competition with the skilled tradesmen and artisans of other countries. The former officers were re-elected as follows: William A. Redfield, Brooklyn, N. Y., president; Howell Cheney, South Manchester, Conn., vice-president; Frederick B. Pratt, Brooklyn, treasurer, and C. A. Prosser, New York, secretary.

The Duplex Metal Company, Chester, Pa., has entered contracts from the Beacon Light Company, of that city, for a large amount of copper clad steel wire for use in connection with electric light and power distribution service. The fire alarm system of Chester, Pa., is now entirely equipped with the Duplex copper clad wire.

Ella furnace of Pickands, Mather & Co., West Middlesex, Pa., which has been idle for a long time, will be blown in about January 1, and will run on foundry and malleable irons, making the old brands of Ella soft and Ella strong that were well known in past years.

The Philadelphia Foundrymen's Association

The regular monthly meeting of the Philadelphia Foundrymen's Association was held at the Hotel Walton on the evening of December 4. Josiah Thompson presided, while A. A. Miller, of *The Iron Age*, acted as secretary. The annual election resulted as follows: President, Thomas Devlin, Thomas Devlin Mfg. Company.; vice-president, E. E. Brown, E. E. Brown & Co.; treasurer, Josiah Thompson, J. Thompson & Co.; secretary, Howard Evans, J. W. Paxson Company; executive committee—Walter Wood, R. D. Wood & Co.; Thomas M. Eynon, Eynon-Evans Mfg. Company; H. L. Haldeman, Pulaski Iron Company; Walter T. MacDonald, Schaum & Uhlinger, all of Philadelphia, and Walter S. Bickley, Penn Steel Casting & Machine Company, Chester, Pa.; trustees, Thomas Devlin, Josiah Thompson and Howard Evans; official chemist, George C. Davis.

An illustrated paper on "The Oil Engine," was presented by Wm. T. Price, De La Vergne Machine Company, New York. The construction and operation of various types of internal combustion engines were described, beginning with simple gas engines and including high power oil engines, and the speaker gave considerable data as to the comparative cost, efficiency and operating expense. An informal discussion followed. After adjournment a luncheon was served.

The Carnegie Strike.—It is expected that by the end of this week the strike of the train mill crews, which seriously affected operations for a short time at the Carrie furnaces, Homestead Steel Works and Edgar Thomson Steel Works of the Carnegie Steel Company will be over. Many have returned to work, and it is expected that the others will apply for their old positions. All of the Carrie furnaces are in operation, 10 of the 11 Edgar Thomson furnaces are running, and operations at the Homestead works are practically full. The company made no concessions. The whole trouble was due to the discharge of one man, the strikers demanding that he be reinstated, the question of wages not entering into the dispute.

The Gealy Wrench & Mfg. Company, Grove City, Pa., has been forced to build a large addition to its factory to take care of increasing business, and in the past few weeks has added a number of machines to its equipment. These machines will more than treble the capacity of the plant. The increase in business had been so rapid as to throw the company some weeks behind on deliveries. The Gealy pipe wrench, which has heretofore been furnished in five sizes, is now made in an additional size which is a miniature or model of the large sizes and has been brought out for the purpose of furnishing jobbers with models for the use of their salesmen. It has already been found very serviceable in increasing sales. It weighs 8 ounces and is made of the same quality of steel as the larger sizes, making it a practical little tool.

The Atlas Car & Mfg. Company, Cleveland, Ohio, will shortly begin the erection of a plant in the new manufacturing district along the Nickel Plate Railroad in East Cleveland. This company secured a site for the plant over a year ago but decided to defer building until it could dispose of one of its present plants. The company's No. 3 plant on Lakeside avenue has just been sold to a manufacturing concern the name of which has not been announced. The new plant will consist of two main buildings, each 100 x 400 ft., one story. One of these will be used as an erecting shop and the other as a machine shop, and they are expected to be ready for operation in the spring. The company will then have about double its present quarters.

The New York Shipbuilding Company, Camden, N. J., launched December 7 the passenger steamboat Washington Irving, built for the Hudson River Day Steamboat Company, New York, and to be used in the New York City and Albany service. The vessel has a length over all of 416 ft. 6 in. and beam 86 ft. 6 in. The engines have a rating of 6000 hp. The collier Norfolk, built for the Coastwise Transportation Company, was launched at the same yard December 5. The vessel has a capacity of 5000 tons.

The Iron and Metal Markets

A 35,000-Ton Pipe Order

Brazil to Buy 100,000 Tons of Rails

Scarcity of Steel World-Wide—Advance in Nuts and Bolts

That there is some falling off in the volume of specifications is generally reported in the steel trade. As to new business the testimony is not uniform. It has been less with some important companies in the past three weeks than in the first half of November. The Steel Corporation reports more new business in the first week of December than in corresponding days in November. It had an increase of 258,502 tons in unfilled orders in November, of which a little less than 20 per cent. was due to the cutting down of product by the Carnegie trainmen's strike.

Speculative developments and the diversity of opinion as to tariff revision effects are tingeing some views of the situation at a time when business naturally slackens, but the facts as to the urgent call for more steel than the mills can produce and the enormous bookings for next year have not changed.

As an item in the export trade, the inquiry of the Central Railroad of Brazil for 100,000 tons of rails is significant. Europe can furnish little of this order and American mills are not likely to get to it short of six months. The amount of railroad work under way and projected in South America is beyond all precedent.

A notable wrought pipe order on which National Tube Company mills will soon start is for 35,000 tons for the Roumanian government oil pipe line. Inquiry has come also from another foreign field for no less than 110,000 tons for a similar line.

There is a worldwide scarcity of semi-finished steel, and it is a curious fact that while American inquiry for billets has gone to Germany and Great Britain, British works are scouring Belgian and German markets as well as this country to get steel. Eastern Pennsylvania steel companies were asked in the past week for prices on 20,000 tons wanted by an English mill. Leaders in the steel trade who know most of foreign conditions look for full operation of European as well as American mills throughout 1913.

A leading seller of sheet bars has fixed its price for the first quarter of 1913 somewhat below what has lately been paid for early shipment. A New Jersey interest has come into the market for 9000 tons of Bessemer and 3300 tons of open-hearth billets for the first half of 1913.

In some lines the pressure for deliveries of material shows no let-up. Warehouse business is not so heavy in the Central West, due in part to the finishing up of many construction contracts. From the same cause iron and steel works labor supply is better.

It is growing plainer that buyers are no longer urged to cover by fear of higher prices. Yet there are no signs of weakness, and contracts are being made in heavier lines that extend well into the second half of next year. In one line, bolts and nuts, an advance has been made in the past week, bolt discounts being shortened 2½ per cent.

Steel car companies have been for weeks unable to get more than two-thirds of the stipulated deliveries on plates and this condition is likely to continue for many weeks. The Pennsylvania Railroad Company has just placed 3000 cars. What are called live inquiries amount to 50,000. For the year the total of new car orders is put at more than 200,000, as against 130,000 last year.

Some good structural contracts have been given out, including 13,000 tons in New York territory, in which the largest item was 4000 tons for the new Cotton Exchange. At Boston projected pier work will require 7500 tons in the near future, and a much larger amount later. An addition to a Cleveland store will take 3000 tons of Bethlehem shapes, and a Lake Shore lift bridge at Chicago, 2000 tons of steel.

A quiet pig iron market in December has been looked for, but some undercurrents are noticed, and in certain districts more activity. Northern foundry iron is strong and less is heard of the resale Southern iron that could be had at $13.50, Birmingham, for No. 2.

At Pittsburgh a 30,000-ton sale of basic iron for delivery over the first half is reported at $16.35 at Valley furnace, though for 5000 tons of December basic $16.50 was paid. Central Western sellers have been curiously alert over a 5000-ton inquiry for basic from St. Louis, indicating sharper competition than has been noticed for some time.

In the Pittsburgh district all but one of the Carnegie furnaces idle in the recent strike has resumed. With no further interruptions, the country's pig iron output in December should exceed 2,700,000 tons. For the year a total pig iron production above 29,700,000 tons is indicated.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	Dec. 11, 1912.	Dec. 4, 1912.	Nov. 13, 1912.	Dec. 13, 1911.
Pig Iron, Per Gross Ton				
Foundry No. 2 X, Philadelphia.	$18.50	$18.50	$18.25	$14.85
Foundry No. 2, Valley furnace..	17.00	17.00	17.00	13.00
Foundry No. 2, S'th'n, Cin'ti...	17.25	17.25	17.25	13.25
Foundry No. 2, Birmingham, Ala.	14.00	14.00	14.00	10.00
Foundry No. 2, furnace, Chicago*	18.00	18.00	17.50	14.00
Basic, delivered, eastern Pa....	18.25	18.25	18.00	14.25
Basic, Valley furnace	16.50	16.50	16.25	12.25
Bessemer, Pittsburgh	18.15	18.15	17.90	14.90
Malleable Bessemer, Chicago...	18.00	18.00	18.00	14.35
Gray forge, Pittsburgh.....	17.15	17.15	16.40	13.40
Lake Superior charcoal, Chicago	18.75	18.75	18.75	16.50
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh....	27.00	27.00	27.00	19.00
Open hearth billets, Pittsburgh.	27.50	27.50	27.50	19.00
Forging billets, Pittsburgh.....	34.00	34.00	34.00	24.00
Open hearth billets, Philadelphia	32.00	32.00	32.00	21.40
Wire rods, Pittsburgh.....	30.00	30.00	30.00	24.50
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	*17.25*	18.00	18.00	14.50
Iron rails, Philadelphia.....	*18.00*	18.50	19.00	15.50
Car wheels, Chicago.....	17.00	17.00	17.00	13.00
Car wheels, Philadelphia.....	**15.50**	15.00	15.00	12.50
Heavy steel scrap, Pittsburgh..	14.75	14.75	15.25	12.25
Heavy steel scrap, Chicago.....	*12.50*	13.00	13.50	10.00
Heavy steel scrap, Philadelphia.	*14.50*	15.00	15.50	12.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel,	Dec. 11, 1912.	Dec. 4, 1912.	Nov. 13, 1912.	Dec. 13, 1911.
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.67½	1.67½	1.67½	1.25
Iron bars, Pittsburgh.....	**1.70**	1.65	1.55	1.25
Iron bars, Chicago.....	1.55	1.55	1.55	1.15
Steel bars, Pittsburgh, future...	1.40	1.40	1.40	1.10
Steel bars, Pittsburgh, prompt..	**1.70**	1.60	1.60	1.10
Steel bars, New York, future...	1.56	1.56	1.56	1.26
Steel bars, New York, prompt..	**1.86**	1.76	1.76	1.26
Tank plates, Pittsburgh, future	1.45	1.45	1.45	1.15
Tank plates, Pittsburgh, prompt	**1.75**	1.70	1.60	1.15
Tank plates, New York, future..	1.61	1.61	1.61	1.31
Tank plates, New York, prompt.	**1.91**	1.86	1.76	1.31
Beams, Pittsburgh, future.....	1.45	1.45	1.45	1.15
Beams, Pittsburgh, prompt.....	1.75	1.75	1.70	1.15
Beams, New York, future.....	1.61	1.61	1.61	1.31
Beams, New York, prompt.....	1.91	1.91	1.86	1.31
Angles, Pittsburgh, future.....	1.45	1.45	1.45	1.15
Angles, Pittsburgh, prompt.....	1.75	1.75	1.70	1.15
Angles, New York, future.....	1.61	1.61	1.61	1.31
Angles, New York, prompt.....	1.91	1.91	1.86	1.31
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.45	1.12½
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.20
Steel hoops, Pittsburgh.....	1.50	1.50	1.50	1.30

Sheets, Nails and Wire,				
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.25	2.25	2.25	1.90
Wire nails, Pittsburgh.....	1.70	1.70	1.70	1.55
Cut nails, f.o.b. Eastern mills..	1.75	1.75	1.75	...
Cut nails, Pittsburgh.....	1.70	1.70	1.70	1.50
Fence wire, ann'l'd, 0 to 9, P'gh.	1.50	1.50	1.50	1.35
Barb wire, galv., Pittsburgh....	2.10	2.10	2.10	1.90

Coke, Connellsville, Per Net Ton, at Oven:				
Furnace coke, prompt shipment..	$4.00	$4.00	$4.00	$1.55
Furnace coke, future delivery..	3.25	3.25	3.25	1.65
Foundry coke, prompt shipment	**4.50**	4.25	4.25	1.90
Foundry coke, future delivery..	**4.00**	3.75	3.75	2.15

Metals,				
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	17.75	17.75	17.75	13.75
Electrolytic copper, New York.	17.50	17.50	17.55	13.62½
Spelter, St. Louis.....	*7.20*	7.25	7.30	6.25
Spelter, New York.....	*7.35*	7.40	7.45	6.40
Lead, St. Louis.....	4.20	4.20	4.57½	4.37½
Lead, New York.....	4.35	4.35	4.72½	4.45
Tin, New York.....	*49.25*	49.30	50.00	44.35
Antimony, Hallett, New York..	9.50	9.50	9.75	7.60
Tin plate, 100-lb. box, Pittsburgh	$3.60	$3.60	$3.60	$3.40

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.70c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive fire box steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inc.	.25
Cutting to lengths or diameters under 2 ft., to 1 ft., inc.	.50
Cutting to lengths or diameters under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. and over, and zees, 3 in. and over, 1.45c. to 1.70c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.....	1.50 to 1.55
H-beams over 18 in.....	1.50 to 1.55
Angles over 6 in.....	1.50 to 1.55
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card, Sept. 1, 1909.....	1.50 to 1.55
Tees, 3 in. and up.....	1.50 to 1.55
Angles, channels and tees, under 3 in. plus full extras as per steel bar card, Sept. 1, 1909..	1.50 to 1.55
Deck beams and bulb angles	1.75 to 1.80
Hand rail tees	2.20 to 2.30
Checkered, trough and corrugated floor plates..	2.35 to 2.55

Extras for Cutting to Length.

	Cents per lb.
Under 3 ft., to 2 ft. inclusive.....	.25
Under 2 ft., to 1 ft. inclusive.....	.50
Under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Wrought pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (card weight) in effect from September 10, 1912, one point greater being allowed on merchant weight; iron pipe (full weight), from October 21, 1912:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜.....	72	52	⅛ and ¼.....	67	48
½	76	66	⅜	66	47
¾ to 3.....	79	71	½	70	57
			¾ to 2½.....	73	62

Lap Weld.

2	76	68	1¼	57	46
2½ to 6.....	78	70	1½	68	57
7 to 12.....	76	66	2	69	59
13 to 15.....	53	..	2½ to 4.....	71	62
			4½ to 6.....	71	62
			7 to 12.....	69	56

Plugged and Reamed.

1 to 3, butt.....	77	69	1 to 1½, butt.....	71	60
2, lap	74	66	2, butt	72	61
2½ to 4, lap.....	76	68	1¼, lap	55	44
			1½, lap	66	55
			2, lap	67	57
			2½ to 4, lap.....	69	60

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜.....	68	58	⅜	64	53
½	73	67	½	68	61
¾ to 1½.....	77	71	¾ to 1½.....	72	63
2 to 3.....	78	72	2 and 2½.....	73	64

Lap Weld, extra strong, plain ends.

2	74	66	1½	66	60
2½ to 4.....	76	68	2	67	59
4½ to 6.....	75	67	2½ to 4.....	71	62
7 to 8.....	68	58	4½ to 6.....	70	61
9 to 12.....	63	53	7 and 8.....	64	54
			9 to 12.....	59	48

Butt Weld, double extra strong, plain ends.

½	63	57	½	58	50
¾ to 1½.....	66	60	¾ to 1½.....	61	53
2 to 2½.....	68	62	2 to 2½.....	63	55

Lap Weld, double extra strong, plain ends.

2	64	58	2	56	50
2½ to 4.....	66	60	2½ to 4.....	61	55
4½ to 6.....	65	59	4½ to 6.....	60	54
7 to 8.....	58	48	7 to 8.....	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, $30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.50; galvanized, $1.90. Galvanized barb wire, to jobbers, $2.10; painted, $1.70. Wire nails to jobbers, $1.70.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.65	$1.70	$1.75	$1.80	$1.90	$2.00	$2.10	$2.20
Galvanized	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		*Standard Charcoal Iron.*	
1⅜ to 2¼ in.....	62	1½ in.	46
2½ in.	64½	1¾ to 2¼ in.....	48
2¾ to 3¼ in.....	69½	2½ in.	53
3½ to 4½ in.....	72	2¾ to 3¼ in.....	53½
5 and 6 in.....	64½	3½ to 5 in.....	58
7 to 13.....	62	Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.60 to 1.70
Nos. 9 and 10	1.65 to 1.75
Nos. 11 and 12	1.70 to 1.80
Nos. 13 and 14	1.75 to 1.85
Nos. 15 and 16	1.80 to 1.90

Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	1.90 to 2.00
No. 12	1.90 to 2.00
Nos. 13 and 14	1.95 to 2.05
Nos. 15 and 16	2.00 to 2.10
Nos. 17 to 21	2.05 to 2.15
Nos. 22 and 24	2.10 to 2.20
Nos. 25 and 26	2.15 to 2.25
No. 27	2.20 to 2.30
No. 28	2.25 to 2.35
No. 29	2.30 to 2.40
No. 30	2.40 to 2.50

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.40 to 2.50
No. 12	2.50 to 2.60
Nos. 13 and 14	2.50 to 2.60
Nos. 15 and 16	2.65 to 2.75
Nos. 17 to 21	2.80 to 2.90
Nos. 22 and 24	2.95 to 3.05
Nos. 25 and 26	3.10 to 3.20
No. 27	3.25 to 3.35
No. 28	3.40 to 3.50
No. 29	3.55 to 3.65
No. 30	3.70 to 3.80

Pittsburgh

PITTSBURGH, PA., December 11, 1912.

Pressure on the mills for deliveries is as strong as ever, but there has been a decided quieting down in new buying in practically all finished products. The holiday season and inventory period being at hand, consumers in need will buy as little as possible or will put off buying as long as they can. Makers are not worrying, as they feel that if little buying is done over the next month or two it will give them a chance to catch up to some extent on deliveries and to better satisfy their customers who are making impossible demands for shipments. A leading steel car company states that its deliveries of plates the last few months have only been 60 to 70 per cent. of what they should have been, and says that instead of the situation improving it is getting worse. A feature of the market now to which attention can be drawn is that a general feeling prevails that prices on pig iron and rolled products are high enough and efforts should be made to keep them where they are. This view of the matter was taken long ago by the United States Steel Corporation, and its subsidiary companies have been selling for several months for delivery over all of next year at current market prices, reserving of course the privilege of shipping at their convenience. The Carnegie Steel Company has very heavy contracts booked for plates and shapes for delivery through the first six or nine months of next year at 1.45c. and steel bars at 1.40c. It has also sold hoops and bands and other material for long periods ahead, and this action has no doubt had the effect of largely steadying prices and preventing to a great extent a runaway market. Most of the large manufacturers have a good part of their output for first half under contract, and full operation of the mills for that period seems pretty certain.

Pig Iron.—The largest sale of the week was one of 30,000 tons of basic by the Brier Hill Steel Company, Youngstown, Ohio, to the Pittsburgh Steel Company for delivery over first half at the reported price of $16.35, Valley, equal to $17.25, delivered at Monessen, Pa. The Pittsburgh Steel Company also bought last week from a maker in the Wheeling district 4000 or 5000 tons of basic for December shipment. It is stated this iron was sold at $16.50 at furnace. Printed reports of sales of basic iron at $17 at Valley furnace are strongly denied, $16.50 being the highest price reached. A number of the furnaces have been making more or less off iron recently, as the coke they have been using is not up to the standard. We note a sale of 600 tons of off-basic at $16 at furnace and one of 1500 tons at $16.50. W. P. Snyder & Co. report the average price of Bessemer iron in November as $17.172, and basic $16.192, an advance in both cases over the October average price. It is stated that the Commonwealth Steel Company of St. Louis is inquiring for 5000 tons of basic for first half. The market is firm. We quote standard Bessemer iron for first quarter and first half delivery at $17.25; basic, $16.35 to $16.50, for same deliveries; No. 2 foundry, $17 for prompt and $17.25 for first quarter; malleable Bessemer, $17 to $17.25; gray forge, $16.25 to $16.50, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90c. a ton.

Billets and Sheet Bars.—One of the leading makers of steel has fixed prices on sheet and tin bars for first quarter delivery to regular customers at somewhat under current quotations, which represent premiums for reasonably prompt shipment. A very large steel maker has paid above $27 for Bessemer billets within the past few weeks to help out on its contracts. A sale of 1000 tons of open hearth sheet bars, equal deliveries January and February, is reported at about $27.50 at maker's mill. Hardly enough steel is being sold in the open market to fix prices, as nearly all consumers are covered by contracts, but on which deliveries by the mills are unsatisfactory. We make nominal quotations as follows: Bessemer billets, $27; Bessemer sheet bars, $27.50; open hearth billets, $27.50, and open hearth sheet bars, $28, f.o.b. mill, Pittsburgh or Youngstown. Forging billets are $34 or higher and axle billets are about $32 to $33, Pittsburgh.

Ferroalloys.—Prices on 80 per cent. English ferromanganese for delivery in second half of 1913 have been advanced $4 a ton, or from $61 to $65, Baltimore. No fixed price has been made for first half, each inquiry coming out being considered separately and a price made on it. Sales have been made of some 200 tons of 80 per cent. at about $70 for January shipment, and 350 tons at $70.50 for same delivery. On an inquiry for 500 tons for first half, one New York importer reported $67, Baltimore, but the business has not been placed. Spot ferromanganese is very strong at $75, Baltimore, in carload lots. We quote 80 per cent. English ferromanganese for first half at $67 to $68; for second half, $65; and for spot shipment, $75, all at Baltimore. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons to 600 tons, $74; over 600 tons, $73, Pittsburgh. We quote 10 per cent. at $24; 11 per cent., $25; 12 per cent., $26, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over and 12½c. in lots up to 2000 lb.

Steel Rails.—Of the Philadelphia & Reading Railroad order for 25,000 tons, the Cambria Steel Company and the Carnegie Steel Company each received 5000 tons. The Pittsburgh & Lake Erie bought 12,000 tons of rails some months ago, instead of last week, as reported in some quarters. The new demand for light rails is active, the Carnegie company having received new orders and specifications in the past week for close to 4500 tons, coal mining interests doing most of the buying. The light rail mill of this company at Bessemer is filled up through January. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c., 16 and 20 lb., 1.30c.; 12 and 14-lb., 1.35c., and 8 and 10-lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Wire Rods.—There is a good deal of new inquiry, but buyers are having trouble to find mills that can make deliveries. We quote Bessemer, open hearth and chain rods at $30, Pittsburgh.

Muck Bar.—The supply of available muck bar is larger and there is not much new inquiry with the result that prices are slightly lower. One dealer has been offering standard grade muck bar at $31.50, Pittsburgh, in the past week without finding a buyer.

Skelp.—A leading maker, ordinarily not a buyer in the open market, is reported to have bought in the past week 4000 to 5000 tons of sheared iron plates at about 1.85c., Pittsburgh. The market is very firm. We quote grooved skelp at 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.85c. to 1.87½c., delivered at buyers' mills in the Pittsburgh district.

Plates.—The Pennsylvania Railroad has bought 1500 gondola cars, taking 500 each from the Pressed Steel Car Company, American Car & Foundry Company and Ralston Steel Car Company; also 1500 coke cars, of which the American Car & Foundry Company got 200, the Standard Steel Car Company 600 and the Cambria Steel Company 700. Active inquiries in the market include 2500 to 3000 general service cars for the Illinois Central; 3000 steel hoppers for the Chesapeake & Ohio, with reports that the Union Pacific system has, or will soon have, inquiries out for 8000 to

10,000 cars. The Carnegie Steel Company has taken about 5000 tons of plates and shapes for the five new torpedo boat destroyers to be built in Eastern shipyards. We quote ¼-in. and heavier tank plates at 1.45c. to 1.50c., Pittsburgh, for delivery at convenience of the mill, which would be not before second quarter and possibly third quarter, while for delivery in four to six weeks from 1.55c. to 1.60c. is quoted, and for shipment in two weeks 1.75c. to 1.80c. is said to have been done.

Structural Material.—New inquiry has been quiet in the past week and no local work has been placed. The Noelke-Richards Iron Works has taken 600 tons for an apartment house and about 500 tons for a bank building at Lexington, Ky. The American Bridge Company has booked 4000 tons for the New York Cotton Exchange building, and the Virginia Bridge & Iron Company, Roanoke, Va., has taken a pier for the Clyde Line at Charleston, S. C., 1500 to 2000 tons. Bids have gone in on 600 tons for the Magee Memorial Hospital in this city. We quote beams and channels up to 15-in. at 1.45c. for delivery at the convenience of the mill, while small lots for delivery in two to four weeks are bringing from 1.75c. to 2c. or higher.

Car Wheels.—A very heavy demand is felt for steel wheels. The Carnegie Steel Company has received an order for 8000 from one railroad and 12,000 from another. We quote 33-in. wheels for freight service at $15 to $15.50 and 36-in. for passenger cars at $19 to $19.50 per wheel f.o.b., Pittsburgh.

Iron and Steel Bars.—While the new demand for iron and steel bars continues active it is not so heavy, as consumers are pretty well covered. All are specifying freely against contracts. The Carnegie Steel Company is understood to have practically its entire output of steel bars for first half under contract and other makers are pretty well sold through first quarter and have much business on their books for second quarter. Makers of iron bars state they have more actual orders on their books than at any time in the last five years. A number of bar iron mills are being started up that have not been active for a long time. We quote merchant steel bars at 1.40c. to 1.45c. for delivery at convenience of the mill; for reasonably prompt shipment 1.60 to 1.75c. is paid by consumers, and in isolated cases, it is said, that 2c. has been secured for prompt shipment. We quote iron bars at 1.70c. to 1.75c. for reasonably prompt shipment. Mills continue to charge $1 extra per ton for twisting ¼ in. and larger steel bars and $2 extra for ½ in. to ⅝ in.

Sheets.—The new demand is fairly heavy. The mills will close the year with a heavy tonnage on their books that should have been shipped if the mills were able to turn out sheets as fast as consumers wanted them. The protracted scarcity of labor and steel has operated against the mills in securing maximum output, and there is still trouble from these two causes. A number of times in the past four or five months the American Sheet & Tin Plate Company went into the open market and bought very large tonnages of sheet bars, being unable to get enough from the Carnegie Steel Company, its regular source of supply. With orders already on their books and the tonnage in sight, the sheet mills are assured of practically full operation through the winter months. The American Sheet & Tin Plate Company has opened its books for contracts for sheets for the second quarter of next year.

Tin Plate.—An announcement of interest to the trade is that the American Sheet & Tin Plate Company has opened its books for contracts for both tin and terne plate to jobbers for second quarter. In September this company and other makers opened their books for contracts from jobbers for first quarter and from consumers for second and third quarter. Large contracts for tin plate have been booked by the companies for first and second quarter delivery, and in the cases of manufacturers of finished product from tin plate, such as the can makers, their contracts were accepted for delivery through second quarter and in some cases through third quarter. There is still some talk of an advance, but several of the large makers state that they have not seriously considered such action. The American Sheet & Tin Plate Company is running its hot tin mills to about 90 per cent. of capacity, and the independent mills are running practically full. Operations in December and January will probably slow down to some extent. Prices are firm, but premiums for prompt deliveries have disappeared. We quote 100 lb. cokes at $3.60 and 100 lb. common ternes at $3.45.

Spelter.—The market has been quiet with prices steady. We quote prime grades of Western at 7.25c. St. Louis, equal to 7.37½c., Pittsburgh.

Railroad Spikes.—Several roads are reported as being in the market for 40,000 to 50,000 kegs for delivery over first half. All the makers are well filled up through first quarter and have many contracts for delivery in second quarter. The railroads are specifying very freely, and the mills are back in deliveries from six to eight weeks in some cases. There is a continued scarcity in the supply of small railroad and boat spikes which are bringing premiums of $2 to $3 a ton over regular prices for prompt delivery. We quote railroad spikes in base sizes, 5½ x 9/16 in., at $1.90 and small railroad and boat spikes at $1.90 and $2 per 100 lb., f.o.b. Pittsburgh, for first quarter and first half of 1913 delivery.

Hoops and Bands.—There is a fair amount of new buying. Prices are firm, and for prompt deliveries premiums are being paid. We quote steel bands at 1.40c. to 1.45c., with extras as per the steel bar card, and hoops at 1.50c., Pittsburgh, for shipment through first half of next year.

Bolts and Rivets.—It is stated that a further advance on rivets and bolts may be made in a few days, due to the heavy demand and the higher prices of raw materials. On nuts and bolts two makers report that they have sold up their entire output for the next three months and on rivets three to four months. The new demand is active. We quote button head structural rivets at $2.10 and cone head boiler rivets at $2.20 per 100 lb. for forward delivery, but for spot shipment a premium of $2 a ton over these prices is obtained. The discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 7½% off
Small carriage bolts, rolled threads	75, 10 and 2½% off
Large carriage bolts	70 and 5% off
Small machine bolts, rolled threads	75, 10 and 7½% off
Small machine bolts, cut threads	75, 10 and 2½% off
Large machine bolts	70 and 10% off
Machine bolts with C.P.C. and T nuts, small	75 and 7½% off
Machine bolts with C.P.C. and T nuts, large	70 and 2½% off
Square hot pressed nuts, blanked and tapped	$5.80 off list
Hexagon nuts	$6.40 off list
C.P.C. and R. square nuts, tapped and blank	$5.80 off list
Hexagon nuts ⅝ and larger	$6.70 off list
Hexagon nuts smaller than ⅝	$7.30 off list
C.P. plain square nuts	$5.30 off list
C.P. plain hexagon nuts	$5.60 off list
Semi-finished hexagon nuts ⅝ and larger	85 and 5% off
Semi-finished hex. nuts smaller than ⅝	85, 10 and 5% off
Rivets, 7/16 x 6½, smaller and shorter	75, 10 and 10% off
Rivets, metallic tinned, bulk	3½c. per lb. net extra
Rivets, tin plated, bulk	1½c. per lb. net extra
Rivets, metallic tinned, packages	70, 10 and 10% off

Wire Products.—The demand for plain and barb wire has quieted down, as the season is pretty well over, but for wire nails is fairly active. Jobbers have recently placed heavy contracts for wire nails for delivery in January and February at the regular price of $1.70 base per keg, and this is taken as a strong indication that the expected advance on wire nails may not be made. Two of the leading makers are still quoting $1.75 base per keg, but are meeting the market to regular customers. The output and shipments of wire nails continue heavy, jobbers accumulating as large stocks as possible for fear of delays in winter weather. One maker reports that on prompt deliveries of wire nails it is able to obtain premiums of about 10c. per keg. We quote wire nails at $1.70 to $1.75 per keg; cut nails, $1.70 per keg; galvanized barb wire, $2.10 per 100 lb.; painted, $1.70; annealed fence wire, $1.50, and galvanized fence wire, $1.90, f.o.b. Pittsburgh, usual terms, freight added to point of shipment. Jobbers charge the usual advances for small lots from store.

Merchant Steel.—A leading maker reports that its entire output for first quarter is under contract, with much business on its books for second quarter. Specifications against contracts continue to come in very freely and prices are strong. Most makers are back in deliveries six to eight weeks or longer. The demand for cold-rolled strip steel is referred to as very heavy, with the mills back considerably in shipments. Prices are firm, and we quote: Iron finished tire, 1½ x ⅜ in. and larger, 1.40c. to 1.55c., base; under 1½ x ⅜ in., 1.55c. to 1.65c.; planished tire, 1.60c. to 1.70c.; channel tire, ¾, ⅞ and 1 in., 1.90c. to 2c.; 1⅛ in. and larger, 1.80c. to 1.90c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.50c. to 1.65c.; concave and convex, 1.80c. to 1.90c.; cutter shoes, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c. to 1.85c.

Shafting.—The new demand is fairly heavy. It is stated that the automobile builders are taking more shafting than in any former period, and the implement makers are also specifying heavily. Prices are firm. We quote cold-rolled shafting at 60 per cent. in car-

load lots and 55 per cent. in small lots delivered in base territory.

Merchant Pipe.—The makers of iron pipe held a meeting in Philadelphia last Friday, and the leading companies will adopt the list weights and list prices for iron pipe, as announced for steel pipe by the National Tube Company, to go into effect January 1. It has always been the contention of the makers of iron pipe that they were furnishing practically full weight pipe to their customers, so that their action in adopting the new list is a natural result. The makers of steel pipe held a meeting in this city on Wednesday of last week and decided that they would also adopt the new list of the National Tube Company, so that commencing January 1 there will be a more uniform pipe market than there has ever been. The National Tube Company, through the United States Steel Products Company, has closed a contract for nearly 600 miles of steel pipe for shipment to the Roumanian oil fields. To be exact, the contract calls for 1,070,000 ft. of 5-in., 296,000 ft. of 9-in. and 689,000 ft. of 10-in. Shipments will begin early in the new year. This is the largest single contract for line pipe for export ever placed, being considerably larger than the Calgary order of last fall. The National Tube Company has also taken a contract for 20 miles of 20-in. steel pipe for the Hope Natural Gas Company. An inquiry is in the market for 130 miles of 16-in. line pipe for a California natural gas company. The new demand for merchant pipe is quieting down, but there is a very heavy inquiry for large pipe for delivery early in the new year. Indications are that next year will be very active in oil and gas line enterprises. All the pipe mills will close the year with considerable tonnage on their books that should have been shipped out.

Boiler Tubes.—There is a fair amount of new buying in merchant and locomotive tubes. Several of the leading makers report an increase of 20 to 25 per cent. in business this year over last year, and the outlook for 1913 is regarded as very good. It is stated that regular discounts on locomotive and merchant tubes are being quite well maintained.

Iron and Steel Scrap.—There is no perceptible increase in the demand, and buying is likely to be quiet until after the first of the year. All the leading consumers seem to have plenty on hand to meet their needs this month but are taking in deliveries on contracts quite promptly. It is believed that after January 1 prices on scrap may improve, as the surplus tonnage now hanging over the market is expected to be pretty well cleaned up the coming month. Sales of 1500 to 2000 tons of standard heavy steel scrap are reported at $14.75, delivered at buyer's mill. A sale of 500 tons of low phosphorus melting scrap is reported at $18.25, delivered. Dealers quote, per gross ton, as follows:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$14.75 to $15.00
No. 1 foundry cast	14.50 to 14.75
No. 2 foundry cast	13.50 to 13.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	12.75 to 13.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	16.25 to 16.50
No. 1 railroad malleable stock	14.25 to 14.50
Grate bars	10.75 to 11.00
Low phosphorus melting stock	18.25 to 18.50
Iron car axles	24.25 to 24.75
Steel car axles	17.75 to 18.00
Locomotive axles, steel	21.75 to 22.00
Locomotive axles, iron	27.75 to 28.00
No. 1 busheling scrap	14.25 to 14.50
No. 2 busheling scrap	9.75 to 10.00
Old car wheels	15.75 to 16.00
*Cast iron borings	9.90 to 10.00
*Machine shop turnings	10.50 to 10.75
†Sheet bar crop ends	16.50 to 16.75
Old iron rails	16.25 to 16.50
No. 1 railroad wrought scrap	15.00 to 15.25
Heavy steel axle turnings	12.75 to 13.00
Stove plate	10.75 to 11.00

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Coke.—The new demand for furnace coke for prompt shipment has quieted down, as consumers evidently get coke as fast as they need it. Several large inquiries for furnace coke for delivery over first half of next year have come out, and a number of contracts have been closed. A Cleveland furnace company is inquiring for about 12,000 tons per month and one at Buffalo for the same amount for delivery over first half. The Wisconsin Steel Company is reported to have closed for a large tonnage. We note a contract for 5000 tons and another for 4000 tons per month for first half at $3.25 at oven. The coke market is firm, and, in view of the nearness of the holidays, it would not be surprising if prices of furnace and foundry coke for prompt shipment would show an advance. It is not likely that many of the coke workers will do much work between Christmas and New Years. The Pittsburgh Steel Company, which has been quietly sounding the market for about 30,000 tons of coke per month for shipment commencing next May, has not yet closed. We quote standard makes of furnace coke for prompt shipment at $4 per net ton at oven, while foundry is ruling at $4.50 to $4.75. We quote standard makes of furnace coke on contracts for first half of next year at $3.25 per net ton at oven, and standard makes of 72-hr. foundry at $3.75 to $4 per net ton at oven. Two leading consumers of foundry coke that have not yet covered are refusing to pay the high prices quoted for first half delivery, and have stated they will buy a part of their requirements from month to month in Connellsville foundry coke and the balance in lower grade coke, thus being able to reduce the cost considerably. The Connellsville Courier reports the output of coke in the Upper and Lower Connellsville regions last week at about 400,000 net tons, a decrease over the previous week of 4000 tons.

The La Belle Iron Works, Steubenville, Ohio, manufacturer of pig iron, open-hearth steel, pipe, sheets and cut steel nails, will open offices about January 1 at 2320-2321 Oliver Building, Pittsburgh. This is following out the policy of the company in having direct representation in the leading cities of the country.

Chicago

CHICAGO, ILL., December 11, 1912—(*By Telegraph*).

The anticipated decrease in contract specifications has become more apparent, more particularly with reference to structural material, steel bars and plates. Iron bars, on the contrary, are much in demand, largely because of the reasonably prompt deliveries available. There has also been a moderately active buying of plates for first quarter from those mills which are just now opening their books for that delivery. The purchase of 60,000 tons of rails by the Northwestern Lines has now become generally known. Local warehouse stocks are now in much better shape, and the relatively low basis upon which material out of store can be obtained in this market as compared with other districts is doubtless a factor in the exceptionally active movement from warehouse. A sale of 2000 tons of malleable pig iron and an inquiry from St. Louis territory for 5000 tons of basic are prominent in an otherwise quiet pig iron situation. The demand for scrap is still very limited and the market is weak.

Pig Iron.—Competition is observed between local and Ohio furnaces over the pending inquiry for 5000 tons of basic from the Commonwealth Steel Company. Other inquiries include 500 tons of foundry iron from a Wisconsin manufacturer and 500 tons of charcoal iron. A sale of 2000 tons of malleable Bessemer is also reported. Local furnace prices continue very firm at $18, minimum. There is little inquiry for Southern iron but the price for forward delivery continues firm at $14.50, Birmingham. Spot shipment iron can be had quite freely at $14, and the movement of resale iron in this market is not contributing to strength in that quotation. We quote local irons, f.o.b. furnace, the average switching charge to Chicago foundries being about 50c. a ton. Other quotations are for Chicago delivery. Prices on prompt shipment are as follows:

Lake Superior charcoal, Nos. 1, 2, 3, 4	$18.75 to $19.75
Northern coke foundry, No. 1	18.50 to 18.75
Northern coke foundry, No. 2	18.00 to 18.25
Northern coke foundry, No. 3	17.50 to 18.00
Southern coke, No. 1 foundry and No. 1 soft	18.85 to 19.35
Southern coke, No. 2 foundry and No. 2 soft	18.35 to 18.85
Southern coke, No. 3	17.85 to 18.35
Southern coke, No. 4	17.35 to 17.85
Southern gray forge	17.35 to 17.85
Southern mottled	16.85
Malleable Bessemer	18.00 to 18.25
Standard Bessemer	19.40 to 19.90
Basic	18.00 to 18.25
Jackson Co. and Kentucky silvery, 6er cent.	20.40
Jackson Co. and Kentucky silvery, 8 per cent.	21.40
Jackson Co. and Kentucky silvery, 10 per cent.	22.40

(By Mail)

Rails and Track Supplies.—The orders for the rails for which the Chicago & Northwestern Railroad was in the market, covering the requirements of both the Chicago & Northwestern and the Omaha lines, has been placed with the Illinois Steel Company. The closing of the contract was arranged some time ago but the information is only now becoming generally public. The tonnage involved totaled 60,000. Railroad specifications for track supplies continue surprisingly heavy despite

a gradual decrease since the first of the month. We quote standard railroad spikes at 1.95c. to 2.05c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, $32 to $34.50 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Current inquiry for fabricated material is light, and mill specifications are also showing the gradual diminution naturally expected in December. The week's total of contracts for structural material aggregated about 5000 tons, including 2700 tons which has been up for figures for some time. The South Halsted Street Iron Works was awarded 1630 tons for the Carter Harrison High School, Chicago, and the Toledo Bridge & Crane Company took 1096 tons for the Chicago avenue bridge. The American Bridge Company will furnish 248 tons for the Elgin, Joliet & Eastern Railroad and the Wisconsin Bridge & Iron Company 840 tons for the Chicago, Milwaukee & St. Paul. Other contracts included 663 tons for the Old Dominion Mining & Smelting Company, Globe, Ariz., 197 tons for the Northern Pacific Railroad and 260 tons for highway spans near Keokuk, Iowa. We quote for Chicago delivery from mill, plain shapes, 1.63c. to 1.90c.

Local jobbers have succeeded to a large extent in replenishing their depleted structural stocks, and with few exceptions the demand for store shipment can be satisfied in the full line of shapes within four days. Angles cut to length involve a slightly delayed delivery.

Plates.—Reports from plate users indicate that some of the mills have not been able entirely to resist the temptations of premium business although the situation as to deliveries on contract shows no improvement. Other smaller mills that are just now opening their books for first quarter business are taking sizable tonnages for delivery in three to five weeks. About 5000 tons was so booked by one interest in one day of last week. A small order for Pacific coast shipment, delivery to be made in six weeks, was placed at 1.68c., Chicago, which for that destination is equivalent to the same price at Pittsburgh. The pending inquiries of the New York Central Lines, the Missouri, Kansas & Texas and the Missouri Pacific, for an aggregate of 15,000 cars, constitute the bulk of prospective car business in this market. We quote for Chicago delivery, mill shipment, 1.63c. to 1.83c.

While not possible of so rapid handling as some of the other materials, plates out of store can now be shipped with much improved promptness. The demand is considered decidedly heavy for December. We continue to quote for base sizes from store, 2.05c.

Sheets.—The situation has not changed materially, the larger part of the pending business being at a standstill as a result of mill conditions. There is still an active demand, however, from car builders and implement manufacturers, and the smaller mills report active selling to meet these requirements. Prices are unchanged and we quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.53c.; No. 28 galvanized, 3.68c.; No. 10 blue annealed, 1.83c. to 1.88c.

An exceptionally active trade in sheets out of store is reported, and warehouse stocks are now much better balanced as to sizes. We quote sheets out of store as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.80c., and No. 28 galvanized, 4.05c.

Bars.—With fully 75 per cent. of the steel bar tonnage on their contracts specified, the implement manufacturers are well taken care of for the remainder of the year. Current specifications, therefore, show some decrease from the high marks of other months in the year and consist largely of car builders' requirements. Bar iron orders, on the contrary, show practically no falling off. One railroad is inquiring for 4000 tons of bars, and among the sales of the past week were several lots totaling 2700 tons. Substitutions of iron for steel bars are not unusual because of the more favorable deliveries obtainable. We quote for mill shipment as follows: Bar iron, 1.55c. to 1.60c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes ¾ in. and over, and 7½c. extra for smaller sizes; shafting 55 per cent. off.

Rivets and Bolts.—Rivet users appear to be pretty well covered for the present, and current business is confined closely to small miscellaneous orders. The pressure under which bolt makers are completing shipments on contract has not diminished. We quote from mill as follows: Carriage bolts up to ¾ x 6 in., rolled thread, 75-10-2½; cut thread, 75-7½; larger sizes, 70-5; machine bolts up to ¾ in. x 4 in., rolled thread, 75-10-7½; cut thread, 75-10-2½; large sizes, 70-10; coach screws, 80-10; hot pressed nuts, square head, $5.80 off per cwt.; hexagon, $6.40 off per cwt. Structural rivets, ¾ to 1¼ in., 2.28c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ¾ x 4 in., 70-12½; larger sizes, 65-10; carriage bolts up to ¾ x 6 in., 70-10; larger sizes, 65-5 off. Hot pressed nuts, square head, $5.40, and hexagon, $6 off per cwt.

Wire Products.—Consumers of wire products generally are now taking out the remaining tonnage on their contracts, hastening to specify before the expiration date. Current specifications are being maintained to a considerable extent by this movement. Jobbers also are balancing up their stocks, particularly of nails and of barb wire. Fence manufacturers are preparing for a heavy manufacturing season following the inventory period. Prices are firm. We quote plain wire, No. 9 and coarser, base, $1.68 to $1.73; wire nails, $1.88 to $1.93; painted barb wire, $1.88 to $1.93; galvanized, $2.28 to $2.33; polished staples, $1.88 to $1.93; galvanized, $2.28 to $2.33, all Chicago.

Old Materials.—Continued weakness, with further declines in prices, is still the order of the day. The making of scrap by all forms of industry is at high tide but scrap melters have accumulated large stocks. Steel car axles on a recent railroad list brought a good price as compared with the market quotation, but heavy melting scrap was sold as low as $12.75 and is weak at that figure. Foundry grades of scrap are generally more in demand than mill grades and their quotations show less weakness. Recent railroad lists have brought several thousand tons of old steel rails into the market, but for this particular item the demand seems not yet satisfied. The Chicago, Milwaukee & St. Paul is offering 750 tons of old steel rails and 250 tons of iron rails on a list comprising a total of 2500 tons. The Michigan Central will sell 2000 tons and the Lake Shore has a list out. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	$17.25 to $17.75
Old steel rails, rerolling	16.25 to 16.75
Old steel rails, less than 3 ft.	14.50 to 15.00
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	16.75 to 17.25
Heavy melting steel scrap	12.50 to 13.00
Frogs, switches and guards, cut apart	12.50 to 13.00
Shoveling steel	12.25 to 12.75
Steel axle turnings	11.00 to 11.50

Per Net Ton.

Iron angles and splice bars	$16.00 to $16.50
Iron arch bars and transoms	16.75 to 17.25
Steel angle bars	12.75 to 13.25
Iron car axles	21.50 to 22.00
Steel car axles	17.75 to 18.25
No. 1 railroad wrought	12.75 to 13.25
No. 2 railroad wrought	11.75 to 12.25
Cut forge	12.00 to 12.50
Steel knuckles and couplers	12.75 to 13.25
Steel springs	13.25 to 13.75
Locomotive tires, smooth	14.00 to 14.50
Machine shop turnings	8.25 to 8.75
Cast and mixed borings	6.75 to 7.25
No. 1 busheling	11.25 to 11.75
No. 2 busheling	8.25 to 8.75
No. 1 boilers, cut to sheets and rings	9.50 to 10.00
Boiler punchings	12.50 to 13.00
No. 1 cast scrap	13.00 to 13.50
Stove plate and light cast scrap	10.75 to 11.25
Railroad malleable	13.50 to 14.00
Agricultural malleable	11.75 to 12.25
Pipes and flues	10.00 to 10.50

Philadelphia

PHILADELPHIA, PA., December 10, 1912.

The movement in pig iron has been smaller, but prices are well sustained. Hints of weakness in some grades have not been substantiated. Deliveries on foundry grades are steadily hardening. An even volume of business has been transacted in rolled products. Heavy inquiries for steel billets, both for domestic and foreign account, have developed. Plate and shape mills continue operating at top capacity. In practically every line consumers are urging makers for deliveries against contracts. A good volume of business has been placed with the local locomotive builder. Car builders and railroads are active inquirers for materials, although the business placed by the railroads last week showed a falling off. Further weakness has developed in the old material market. Coke has been quiet.

Iron Ore.—Further sales of Lake ores have been made to Eastern furnaces, and a better movement in domestic ores has developed. Belated reports of sales of 100,000 tons of Bathhurst (Canadian) ore are announced, and 125,000 to 130,000 tons of this ore will be brought down next year. Inquiry for additional quantities of Wabana ore are also reported. European ores are quiet owing to prohibitive freights. Importations during the week included 23,700 tons from Cuba and 4520 tons from Spain.

Pig Iron.—A slowing down in the buying movement, following recent heavy purchases, was to be looked for and quiet conditions are expected to continue until after the turn of the year. Consumers are fairly well covered as to near future requirements, but find it difficult to get furnaces to make deliveries as expected. From statistics compiled by the Eastern Pig Iron Association last week, no appreciable change in the volume of unfilled orders or stocks on furnace yards is shown. It is pointed out, however, that stocks were never so low and that they represent about half of what might be considered normal. Under the circumstances producers find it difficult to meet customers' urgent demands and are largely compelled to prorate shipments from their daily make. In Virginia the recent withdrawal of several producers from the market has resulted in a decrease in unfilled orders, although a sharp decline in stocks is reported. Foundry iron of the higher grades for early delivery is very scarce. Transactions in this district have, with few exceptions, been in small lots. In the higher grades few individual sales above 100 tons have been made. Standard eastern Pennsylvania No. 2 X foundry for prompt or first quarter delivery commands $18.50 to $18.75, delivered, although some less desirable brands might be had at a shade less. Few sellers are seeking business, being comparatively well sold up for the first quarter, and are not anxious for more extended contracts. Small sales of Virginia No. 2 X foundry for first quarter continue to be made at $16, furnace, but some producers ask higher prices for prompt. A sale of several thousand tons of low grade iron at $17.75, delivered, has been made to a Delaware River pipe maker. Other pipe makers, while not definitely in the market, would take on considerable tonnage of low grade iron if their idea of prices, usually 25c. to 50c. below the market, was met. Rolling mill forge is quiet and in the absence of business is quoted nominally at $17.75, delivered. Very little movement in steel making grades is reported. Basic iron is extremely quiet, consumers showing no interest in the market. Leading producers' ideas of prices range from $18.25 to $18.50, delivered, but the market has not been seriously tested. Standard analysis low phosphorus iron has been sold in small lots at $24.50, delivered here. New business in any grade of pig iron has been comparatively light; inquiries are confined principally to small, prompt lots, although some of the larger consumers would contract for second half requirements if makers would accept the business. One definite inquiry of this nature has been made by the Norfolk & Western Railroad, which asks quotations for about 5000 tons, mixed coke and charcoal grades, for second half delivery at its Roanoke, Va., shops. Quotations for standard brands, delivered in buyers' yards in this vicinity, extending up to the end of the first quarter of next year, range about as follows:

Eastern Pennsylvania No. 2 X foundry	$18.50 to $18.75
Eastern Pennsylvania No. 2 plain	18.25 to 18.50
Virginia No. 2 X foundry	18.80 to 19.00
Virginia No. 2 plain	18.55 to 18.75
Gray forge	17.75
Basic (nominal)	18.25 to 18.50
Standard low phosphorus	24.00 to 24.50

Ferroalloys.—Uncertainty still prevails as to prices of 80 per cent. ferromanganese. Moderate sales for last half of 1913 delivery were made to both Eastern and Western consumers at $61, seaboard, since which, however, prices have been advanced to $65. For first half delivery quotations range from $67 to $70, while for prompt shipment $75 is named. All business for forward delivery must be submitted to principals for acceptance. Very little movement in ferrosilicon, either 50 per cent. or furnace grades, is reported. Importations of ferromanganese at this port last week aggregated 1186 tons.

Billets.—An Eastern consumer is in the market for 18,000 tons of rolling and 3000 tons of special steel billets. An inquiry for 20,000 tons of rolling billets has also been received from an English buyer. A number of smaller inquiries for first quarter and half of next year have developed, but producers are practically covered for the first quarter, after making usual reservations for regular customers, and are not entering second quarter business very extensively. Prices are firmly maintained at $32, delivered, for first half basic open hearth rolling billets, and $36 minimum, at mill, for ordinary forging billets. Premiums continue to be offered for prompt shipments, but few producers are in a position to accept such business.

Plates.—Efforts continue to be made to get Eastern mills to accept contracts for extended shipment, but, as a rule, they confine themselves to entering first quarter business at 1.75c. to 1.80c. for sheared and 1.80c. to 1.85c. for universal plates, delivered in this district. Heavy inquiries continue to be received from car builders, including one of 5000 tons for comparatively early delivery. Railroads are placing specifications freely, while considerable business is coming from locomotive builders. Mills are operating at full capacity and still find it difficult to meet delivery dates. It is almost impossible to place orders with mills for any quantity of prompt plates.

Structural Material.—A few contracts for moderate building and bridge work have been placed, but there is little new in the way of large, definite tonnages in fabricated work. Plain shape makers continue actively engaged and have booked considerable business for delivery the first and second quarter. Several mills are practically sold up for the first quarter. Prices are very firm; first and second quarter business is being taken by Eastern mills at 1.75c. minimum for plain shapes, but prompt shipments, when available, bring up to 2c., mill.

Sheets.—A large volume of business is being offered to Eastern mills, in instances covering requirements extending through all of next year. Considerable first and some little second quarter business has been entered, but makers have not yet committed themselves to more extended delivery. Western sheets are scarce. Mills continue to fall behind on deliveries and prompt sheets command sharp premiums. Western No. 10 blue annealed sheets for uncertain delivery are quoted at 1.80c. here. Eastern mills making smooth, loose-rolled sheets obtain 2.05c., delivered, for reasonably good shipments.

Bars.—A fairly active demand for both steel and iron bars continues. Mill activities are maintained and prompt bars are scarce. Additional mill capacity is slow in getting into operation. Prices remain unchanged, but are strong. Orders subject to extended delivery are taken for iron bars at 1.67½c., delivered, but if early shipment is desired quotations range from 1.77c. to 2c., according to condition of sellers' order books. Steel bars for forward shipment are quoted at 1.55c. to 1.60c., while prompt steel bars easily bring 1.85c., delivered here.

Old Material.—The market still drags and prices show a sagging tendency. Transactions in No. 1 heavy melting steel have been light. Small sales for prompt shipment have been made at $14.50, delivered, but for first quarter delivery the market is firm at $15 to $15.50. Railroad lists have been comparatively light, against which dealers have bid $14.65 to $15 for No. 1 heavy steel. Railroad wrought has been very quiet, with quotations nominal at $16.25 to $16.75, delivered. Old car wheels have been in good demand, inquiries for export to Canada, England and Belgium being reported. Higher prices have been paid for old wheels in this district. Borings and turnings are quiet, with offering prices lower. Prices are irregular, forced sales being freely made at concessions from regular quotations, which, for delivery in buyers' yards in this district, covering eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to $1.35 per gross ton, range about as follows:

No. 1 heavy melting steel (prompt)	$14.50 to $15.00
No. 1 heavy melting steel (first quarter)	15.00 to 15.50
Old steel rails, rerolling (nominal)	17.00 to 17.50
Low phosphorus heavy melting steel scrap	19.00 to 19.50
Old steel axles	20.00 to 20.50
Old iron axles (nominal)	26.00 to 27.00
Old iron rails	18.00 to 18.50
Old car wheels	15.50 to 16.00
No. 1 railroad wrought (nominal)	16.25 to 16.75
Wrought iron pipe	13.50 to 14.00
No. 1 forge fire	13.50 to 14.00
No. 2 light iron (nominal)	8.00 to 8.50
Wrought turnings	11.00 to 11.50
Cast borings	10.75 to 11.25
Machinery cast	15.00 to 15.50
Grate bars, railroad	11.50 to 12.00
Stove plate	11.50 to 12.00
Railroad malleable (nominal)	13.50 to 14.00

Coke.—The tendency toward weakness, particularly in furnace coke, increases. Quotations are irregular and quality is more of a factor in connection with selling prices. Moderate sales of foundry coke have been made at prices ranging from $4 to $4.25 at oven. Furnace coke ranges from $3 to $3.75 at oven, accord-

ing to delivery. The following range of prices is named, per net ton, for delivery in buyers' yards in this district:

Connellsville furnace coke	$5.00 to $5.75
Connellsville foundry coke	6.00 to 6.50
Mountain furnace coke	4.50 to 5.25
Mountain foundry coke	5.60 to 6.10

Cleveland

CLEVELAND, OHIO, December 10, 1912.

Iron Ore.—The heavy buying is over and the market has quieted down. The aggregate of the week's sales is not large. Most consumers who wanted to buy early and had no trouble in getting the desirable ore they prefer, have completed their purchases. Other furnace companies are holding off and are now being visited by ore salesmen. The market is expected to drag along through the winter with occasional sales. Some furnace companies will probably adhere to their previously announced policy of not buying ore until well along in the spring when they will know more about the business outlook for the latter part of next year. Ore firms appear well satisfied with the business booked up to the present time. Some additional Eastern sales have been made, some estimates put the amount already sold for Eastern shipment next year close to 1,500,000 tons. On December 1 reports showed 10,053,836 gross tons of ore on Lake Erie docks, as compared with 9,131,664 tons on the corresponding date a year ago and 9,426,881 tons on December 1, 1910. Shipments direct to the furnaces from May 1 to December 1 this year were approximately 31,660,000 tons. The heaviest direct shipments previous to 1912 were made in the season of 1909 when 30,077,304 tons went to the furnaces between May 1 and December 1. We quote prices as follows: Old range Bessemer, $4.40; Mesaba Bessemer, $4.15; Old range non-Bessemer, $3.60; Mesaba non-Bessemer, $3.40.

Pig Iron.—The market on Northern grades is firm but quiet. A few small lot sales of foundry iron are reported, but there is very little inquiry and none for lots of any size. Local furnaces are adhering to $17.50 furnace for No. 2 foundry for early or future delivery. Consumers generally are taking their iron as fast as they can get it and quite a few requests that shipments be anticipated are being made. The Southern iron market is weak owing to considerable resale iron being offered at $13.50 for No. 2 for early delivery and the first quarter. Most makers, however, are holding to a minimum price of $14. We note the sale of 250 tons of Southern charcoal iron for shipment to the Pittsburgh district for the first half at $25, Birmingham. For prompt shipment and for the first half of 1913 we quote, delivered Cleveland, as follows:

Bessemer	$18.15 to $18.40
Basic	17.40 to 17.75
Northern No. 2 foundry	17.75 to 18.00
Southern No. 2 foundry	17.85 to 18.60
Gray forge	17.00 to 17.25
Jackson County silvery, 8 per cent. silicon	20.55 to 21.55

Coke.—The market is quiet. There is some inquiry for foundry coke for prompt shipment, which is scarce, and the situation in this respect is expected to be worse during the holidays. We quote Connellsville furnace coke at $4 per net ton at oven for prompt shipment and $3.25 for contract. Connellsville 72-hr. foundry coke is held at $4.50 to $4.75 for prompt shipment and $4 to $4.50 for contract.

Finished Iron and Steel.—The Republic Structural Iron Works Company, Cleveland, has taken the contract for structural steel for an addition to Halle Brothers Company store, Cleveland, requiring 3000 tons of steel. Bethlehem sections will be used. Specifications are out for a new lift bridge to be built by the Lake Shore Railroad in Chicago requiring about 2000 tons. The Atlas Car & Mfg. Company, Cleveland, is about to close a contract for 450 tons of steel for a new manufacturing plant. Bids will be received December 19 for the substructure of the Clark avenue bridge, Cleveland. There will be 55 piers, which will require 100 tons of reinforcing bars and from 300 to 1000 tons of steel piling, depending on the plans accepted. The only change in the general situation is some falling off in the heavy volume of warehouse orders and not quite as active a demand as has been prevailing for lots ranging from carloads to 100 tons for early delivery. Consumers continue to crowd mills for shipments on specifications and deliveries are no better. Not a great deal of new inquiry is coming out. Price quotations on steel bars, plates and structural material are unchanged. Bar iron is firm at a minimum quotation of 1.60c., Cleveland. Sheet specifications continue heavy and some of the mills are considerably behind on deliveries. Forging billets are being offered in this market at $36 to $36.50, delivered, for early shipment. Warehouse prices are unchanged at the advance noted last week, steel bars being quoted at 2.10c. and plates and structural material at 2.25c.

Old Material.—There is some inquiry for heavy melting steel, but mills are not ready to pay prices asked by dealers. Dealers are busy shipping on old contracts and as a rule are not looking for additional business at present. Not much activity is expected until after the holidays. The Lake Shore Railroad will close this week on its monthly list. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.

Old steel rails, rerolling	$15.00 to $15.50
Old iron rails	17.50 to 18.00
Steel car axles	18.75 to 19.25
Heavy melting steel	13.50 to 14.00
Old car wheels	13.50 to 14.00
Relaying rails, 50 lb. and over	23.00 to 23.50
Agricultural malleable	12.50 to 13.00
Railroad malleable	14.00 to 14.50
Light bundled sheet scrap	12.50 to 13.00

Per Net Ton.

Iron car axles	$21.00 to $22.00
Cast borings	8.25 to 8.50
Iron and steel turnings and drillings	9.00 to 9.25
Steel axle turnings	9.25 to 9.50
No. 1 busheling	12.00 to 12.50
No. 1 railroad wrought	14.00 to 14.50
No. 1 cast	13.00 to 13.50
Stove plate	10.00 to 10.50
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, December 11, 1912—(*By Telegraph*).

Pig Iron.—Contrary to expectations there is a better demand for foundry iron, doubtless due to the desire of a few melters who are not covered and who are looking for bargains that are generally obtainable at this time of the year. The Michigan melter previously reported as being in the market for 1500 tons of low phosphorus iron for nearby shipment closed for that tonnage with an Ironton furnace agency. For the same delivery a Louisville company bought 500 tons of Southern foundry iron and a Central Western concern contracted for 1000 tons of special Southern charcoal iron around $25, Birmingham. There is yet a small quantity of resale Southern No. 2 foundry iron obtainable below $14 for spot shipment. However, the Northern situation is much stronger, due to the coke shortage, and this has had a tendency to aid Southern producers in holding up prices, and one interest of that section making offerings below the figure named has advanced to $14 for December and first quarter shipment. The regular quoted price of $17, Ironton, for any delivery through the first quarter appears to be firmly established, and as the furnaces in that district have fairly clean yards there is little likelihood that anything better can be done unless on very small quantities of iron that have to be moved promptly. It is rumored that a Central Western rolling mill is quietly feeling around for 5000 tons of basic. A central Ohio firm will buy soon about 500 tons of either Northern or Southern foundry iron, and for first quarter shipment there will be another order placed by a Michigan company covering the same tonnage. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$17.50 to $17.75
Southern coke, No. 2 foundry and 2 soft	17.25 to 17.50
Southern coke, No. 3 foundry	17.00 to 17.25
Southern, No. 4 foundry	16.75 to 17.00
Southern gray forge	16.50 to 16.75
Old silvery, 8 per cent. silicon	20.20 to 20.70
Southern Ohio coke, No. 1	18.70 to 19.20
Southern Ohio coke, No. 2	18.20 to 18.70
Southern Ohio coke, No. 3	17.95 to 18.45
Southern Ohio malleable Bessemer	17.70 to 18.20
Basic, Northern	18.20 to 18.70
Lake Superior charcoal	19.25 to 19.75
Standard Southern car wheel	27.25 to 27.75

(By Mail)

Coke.—The situation is really stronger from a price standpoint, although there is no increased demand for coke, except from furnaces that have not contracted for a first half supply and from a few foundries that need an immediate supply. However, it is stated that a leading Connellsville producer was compelled to close down for a few days and as a consequence prompt shipment coke is bringing fancy prices. For domestic use a small lot of Connellsville 48-hr. coke brought in this market a price equaling $5 per net ton at oven, and a blast furnace operator is known to have paid nearly

$4.50 at oven for a small quantity needed. For prompt shipment Connellsville furnace coke is quoted all the way from $3.75 to $4.25, with 72-hr. grades about 25c. a ton higher. Contrary to the usual rule, both Wise County and Pocahontas coke are quoted around the same figures as Connellsville operators are asking, and in a few instances higher prices have been obtained on small contracts.

Finished Material.—Local mill agencies are still having trouble with customers on deliveries, so far as prompt shipment material is concerned, and jobbers who anticipated the market are apparently able to get fancy prices on structural material. However, the demand has slackened and it is probable that no heavy contracting will be done until after the end of the year. Local warehouse prices on structural material remain around 2.20c. to 2.35c. on structural material and on steel cars about 2.15c.

Old Material.—The mills are overstocked and there is a very light demand from any source and as a result prices have declined about 25c. a ton. The figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards:

Per Gross Ton.

Bundled sheet scrap	$10.50 to $11.00
Old iron rails	14.25 to 14.75
Relaying rails, 50 lb. and up	21.25 to 21.75
Rerolling steel rails	13.25 to 13.75
Melting steel rails	11.25 to 11.75
Old car wheels	12.75 to 13.25

Per Net Ton.

No. 1 railroad wrought	$11.25 to $11.75
Cast borings	7.25 to 7.75
Steel turnings	7.75 to 8.25
No. 1 cast scrap	11.00 to 11.50
Burnt scrap	7.75 to 8.25
Old iron axles	18.25 to 18.75
Locomotive tires (smooth inside)	12.00 to 12.50
Pipes and flues	7.75 to 8.25
Malleable and steel scrap	9.25 to 9.75
Railroad tank and sheet scrap	6.75 to 7.25

Birmingham

BIRMINGHAM, ALA., December 9, 1912.

Pig Iron.—The company which sold pig iron at $13.50, Birmingham, for prompt shipment, states that the sale was due to an exceptional condition at a special furnace yard, which has a small capacity and had become so crowded as not to admit taking on more stock. The company further says it has no more $13.50 iron and very little of any kind for sale. It quotes spot at $14, first quarter at $14.50, and second quarter at $15, and is understood to have sold liberally at these prices for the rest of the year and into January and February. Tenessee pig iron enjoys a cheaper freight rate by 50 c. and over, hence frequently sells 50 c. under Birmingham iron. The market has latterly not been so brisk and sales not so large. The average price obtained has been from $14 to $14.50. It is believed that a good round tonnage might be placed for first and second quarter delivery combined at $14.25 to $14.50. As a rule, however, the larger companies appear to be holding to $14, 14.50 and $15 respectively for spot, first and second quarters. With comparatively little iron to sell, there is no apparent hurry about second quarter business. Athough two more stacks were in operation in November and the output the largest of the year and a car shortage exists, stocks on yards did not increase, remaining at about 75,000 tons, of which 45,000 is free iron. This month's production, with 23 furnaces in operation, will exceed that of November, bringing the total for the year for Alabama to about 1,825,000 tons, the greatest output since 1910, which was the prior record. Operators do not expect much of a revival of business until after the holidays, but are holding for spot and first quarter as follows:

No. 1 soft and foundry	$14.50 to $15.00
No. 2 soft and foundry	14.00 to 14.50
No. 3 foundry	13.75 to 14.25
No. 4 foundry	13.50 to 14.00
Gray forge	13.25 to 13.75
Basic	14.00 to 14.50
Charcoal	25.00 to 25.50

Cast Iron Pipe.—While no especially large orders have been received recently the pipe factories are kept busy on past bookings, and prices are holding firm. The output is moving out about as soon as manufactured. The outlook is good. Prices are firm at $25 per net ton for 4 in. and $23 for 6 in. and up, with $1 added for gas pipe.

Coal and Coke.—Scarcity of cars continues to cut down the output of coal in Alabama and to maintain prices. Cold weather has set in and given a further impetus to the rising tendency. Coke is quite active, with a demand up to the full oven capacity. Inquiries from the West and Mexico have failed to produce business on account of difficulty in securing cars. Prices are ruling at an advance and are maintained at $3.50 to $4.25 per net ton, according to grade, f. o. b. oven.

Old Material.—The demand for old material was never more brisk. There is an especially large call for cast scrap. One deal this week involved 500 tons of light scrap. Dealers are paying higher for their supplies, and their prices to consumers rule accordingly. Prices f. o. b. cars, dealers' yards, are as follows, per gross ton:

Old iron axles	$16.50 to $17.50
Old steel axles	15.50 to 16.00
Old iron rails	14.50 to 15.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	11.50 to 12.00
No. 1 heavy melting steel	11.50 to 12.00
Tram car wheels	12.00 to 12.50
Standard car wheels	13.00 to 13.50
Light cast and stove plate	9.50 to 10.00

Buffalo

BUFFALO, N. Y., December 10, 1912.

Pig Iron.—Placement for the week covering all grades will aggregate about 30,000 tons, including a number of belated orders from users who have been on the inquiry list for some time. Quite a number of inquiries for small tonnages are noted; but the general trend of the market appears to be toward a quiet period incident to the holiday season. Furnaces are working at top-notch pressure, users continuing to requisition for large tonnages in advance. Prices are held steadily but with no inclination to further advances. The only hampering feature is car shortage during the grain movement period. For first half delivery we quote as follows, f.o.b., Buffalo:

No. 1 foundry	$18.00 to $18.25
No. 2 X foundry	17.75 to 18.00
No. 2 plain	17.50 to 17.75
No. 3 foundry	17.25 to 17.50
Gray forge	17.00 to 17.25
Malleable	17.75 to 18.25
Basic	18.00 to 18.25
Charcoal, regular brands and analysis	18.75 to 19.25
Charcoal, special brands and analysis	22.00

Finished Iron and Steel.—Mills are still so far oversold that they are not interested in new contracts, finding that they have first and second quarter obligations on their books sufficient to take practically their entire output for that period. Specifications are coming in to the full extent of balances due on monthly quotas, so that there is no chance for cancellations on account of the enforcement of the non-specification clause in contracts. One of the local jobbers has advanced the price on structural stock to $2.30 per 100 lbs. and one of the smaller Eastern mills is now quoting $1.75 at mill for prompt shipment from rollings. The majority of mills still hold bars at 1.40c. and structural and plates at 1.50c. Fabricated structural lines are seasonably quiet. There is however a large amount of business in view for next spring. Bids are to be taken next week on revised plans for 100 tons for a Settlement House for the Federated Jewish Charities of Buffalo, and figures are being taken this week on a like quantity for a warehouse addition to the plant of the Barcalo Mfg. Company, Buffalo. Bids opened this week, for the Hutchinson High School 1500 tons, and Public Schools Nos. 28 and 57 200 tons each, were rejected and new bids will be called for. The Owego Bridge Company, Owego, N. Y., has been awarded contract for the steel for the State School of Agriculture to be erected at Cobleskill, N. Y., and the Riter-Conley Mfg. Company, Pittsburgh, has the contract from the Erie Construction Company for 1200 tons of steel pipe and platework for penstocks for Salmon River power development at Altmar, N. Y. James Stewart & Co., Chicago, have taken contract for a 2,000,000 bu. grain elevator for the Washburn-Crosby Company at Buffalo, including steel for workinghouse and conveyor bridges.

Old Material.—Demand from consumers is light, users taking material on contract principally, and placing new orders only for a small amount of fill-in requirements, as they are apparently covered by contract for their wants for some time ahead. Consequently the market at present is largely a dealer's market, and their purchases are mainly at prices slightly under the ruling quotations. It is not expected that consumers' demand will revive to any great extent

until after the holidays. We quote as follows, per gross ton f.o.b. Buffalo:

Heavy melting steel	$14.75 to $15.50
Low phosphorus steel	16.75 to 17.25
No. 1 railroad wrought	15.75 to 16.25
No. 1 railroad and machinery cast scrap	13.75 to 14.75
Old steel axles	16.50 to 16.75
Old iron axles	24.25 to 24.75
Old car wheels	16.00 to 16.75
Railroad malleable	13.25 to 13.75
Boiler plate sheared	14.75 to 15.25
Locomotive grate bars	11.50 to 12.00
Wrought pipe	10.25 to 10.75
Tank iron	10.50 to 11.00
Wrought iron and soft steel turnings	8.75 to 9.00
Clean cast borings	8.00 to 8.50

St. Louis

ST. LOUIS, MO., December 9, 1912.

The past week has been marked by quite a decided renewal of the buying movement, though the aggregate is not yet equal to the conditions prevailing before the recent cessation in purchases.

Pig Iron.—The principal feature, despite increased inquiry, is the insistence of the demand for prompt shipment of allotments and requests for anticipation of contracts. Consumption is unquestionably keeping up with recent records. The sales reported have been in greater numbers and include one of 600 tons of Lake Superior charcoal iron, and a large number of minor lots of both Northern and Southern foundry irons running from carloads to 200 and in a few instances 300 tons. Inquiries in the market include one for 5000 tons of basic; another for 300 tons of Southern foundry No. 2, high silicon; one for 500 tons of Southern foundry No. 2, for first half delivery; one for 300 tons for the same delivery and quite a large number of smaller lots for both prompt and deferred shipment, the latter including both first and second quarters. Quotations have stiffened up measurably, though there is not any change in actual figures, which stand at $14.50 for first quarter up to $15 for second quarter for No. 2 Southern, Birmingham basis.

Coke.—Connellsville best 72-hr. selected foundry coke is quoted here at $4.50 per net ton at oven for immediate delivery. Virginia 48-hr. furnace coke quotations are $3.50 at oven for spot and $3.25 on contract. On 72-hr. Virginia the quotation is $4 for both spot and contract. By-product coke is quiet and quoted on the Connellsville basis.

Old Material.—There has been some further revision of the prices in a downward direction, but there is a feeling that there will be no particular change until after the year's business is closed and inventories are taken. Mills and foundries are keeping out of the market and the general demand is holding off. Contrary to the usual situation at the arrival of cold weather, the railroads have been dumping considerable material on the market with the usual result. Relaying rails alone continue active and the demand for these is as sharp as ever, with continued difficulty in getting supplies. Lists out during the week included the Kansas City Southern, 400 tons; Frisco, 500 tons; Wabash, 800 tons. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.

Old iron rails	$15.00 to $15.50
Old steel rails, rerolling	15.00 to 15.50
Old steel rails, less than 3 ft	13.50 to 14.00
Relaying rails, standard section, subject to inspection	24.00 to 25.00
Old car wheels	15.00 to 15.50
Heavy melting steel scrap	13.50 to 14.00
Frogs, switches and guards cut apart	13.50 to 14.00

Per Net Ton.

Iron fish plates	$12.50 to $13.00
Iron car axles	20.00 to 20.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.75 to 12.25
Railway springs	12.00 to 12.25
Locomotive tires, smooth	13.00 to 13.25
No. 1 dealers' forge	9.50 to 10.00
Mixed borings	8.00 to 8.25
No. 1 busheling	11.00 to 11.25
No. 1 boilers, cut to sheets and rings	8.00 to 8.25
No. 1 cast scrap	12.00 to 12.50
Stove plate and light cast scrap	9.00 to 9.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.00 to 10.50
Pipes and flues	8.00 to 8.25
Railroad sheet and tank scrap	7.50 to 8.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	9.50 to 10.00
Bundled sheet scrap	7.50 to 8.00

Finished Iron and Steel.—There is a decided activity in track fastenings which is somewhat surprising to the manufacturers at this season. Bolts, spikes and fish plates are very firm at the last figures. Light rails are moving freely to the coal mines, but the lumber interests are not quite so active. In structural steel the general run of business continues good, though the only large business of the week was the award of the Utah State Building to the James Stewart Company. Shops are specifying freely on contracts and are turning their attention also to adjusting themselves to the extended deliveries, evidently being under the impression that this situation is going to continue for some time. Bars are very strong and the best deliveries obtainable now are four to five months. The demand, however, is keeping steadily up. The wagon and agricultural interests are keeping very active, with excellent prospects reported.

Another British Railroad Strike

Iron Trade Affected by Coke Shortage and Some Northeast Coast Works Close

(By Cable)

MIDDLESBROUGH, ENGLAND, December 11, 1912.

The railroad strike on the northeast coast threatens to dislocate the iron trade. Some Bessemer works and rail mills are already closed for want of coke, as blast furnaces hold hardly any fuel reserves. The situation looks serious. The general position discloses no fresh feature. Pig iron is firm, also semi-finished steel. The Belgians have withdrawn from the billet and sheet bar market as sellers for first half. Ferromanganese has advanced to £12 8s. 9d. We quote as follows:

Cleveland pig iron warrants (closing Tuesday), 67s. 7½d. against 67s. 1d. one week ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 68s. against 67s. 6d. one week ago.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £6, for January-March delivery.

German sheet bars, f.o.b. Antwerp, 112s. 6d.

German 2-in. billets, f.o.b. Antwerp, 107s.

German basic steel bars, f.o.b. Antwerp, £6 4s., a decline of 2s. from last week.

Steel bars, export, f.o.b. Clyde, £8 5s., an advance of 5s.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 10s.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yard, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b Wales, 15s. 1½d., a decline of 1½d. from last week.

American Efforts to Import Steel in Vain—Welsh Tin Plate Outlook Not Good

MIDDLESBROUGH, Nov. 29, 1912.

While the outlook politically varies from day to day, the iron and steel position remains marvelously unaffected so far, apart from the fluctuation of a few pence in the price of Cleveland warrants, which by the way have since last writing touched another record for the year, three months deliveries selling at only a trifle below 70s. a ton. Prices are quite high enough, if we are not to experience some contraction of buying; but all the omens are favorable, and if only the war were out of the way there would be a sharp appreciation in all metals.

Reference has been made repeatedly to the scarcity of material of all kinds. For example, Welsh steel works have been idle for a week or so owing to inability to get supplies of hematite, or Bessemer, iron. These works resumed this week, but others are working only intermittently, and their difficulties are visited upon the heads of their customers, the tin plate mills, whose operations have become far from satisfactory. The position in this respect has not improved within the past week or two. The Balkan war is responsible of course for some slackness in South Wales, especially as regards black sheets, in which a large trade is done, particularly with Roumania, which distributes them over the Balkan peninsula. For this cause and the interruption to shipments a number of mills have closed for the time.

American Tin Plate Exports

Altogether the tin plate and allied trades are not very flourishing just now, and bitter things are said about American competition, which is reported to be injuriously affecting Wales. The prices accepted by United States plants are said by Welsh makers to in-

volve an actual loss on manufacture; at all events they are such that no maker on this side will look at them. Undoubtedly Wales is losing markets, and it is only the more philosophical Welshmen who can express the belief that new markets will open up to make good the loss. Yet after the McKinley tariff which inflicted for the time a severe blow the Welsh trade assumed proportions never previously dreamed of, and it would be rash indeed to assert that the ultimate development of the trade had been attained.

Half-finished products are exceedingly firm, and this week, as already cabled you, the German Verband again raised prices for sheet bars and on Friday billets were raised 1s. while a rise in blooms is pretty certain before long. Consumers who, scared by the war, have been holding off are now nibbling at the market and a most unusual circumstance is that big steel makers are today trying to get billets from America for December and January delivery, but with no appearance of success. The Belgians are practically sold out and France has not been a factor for months past. French home prices have just been raised for semi-finished steel by 10 francs a ton. Belgian home prices were advanced 3½ francs on Tuesday. United States consumers are inquiring urgently for billets from English merchants and from the Verband, but it is almost a hopeless task, for nobody here has anything available worth considering.

The German Iron Market

Divergent Views as to the Effect of the War

BERLIN, November 28, 1912

Views about the effects of the war are rather divergent. Thus a report from the Luxemburg-Lorraine district says: "The Balkan war has not been without effect on business in the heavy iron industry in the southwestern part of the empire. New export orders from Balkan countries have, of course, not come in; on the other hand, some older orders have been held up. Home consumption remains good for the present; and up to a short time ago specifications were coming in very briskly. Nevertheless, the chief characteristic of the market is its quiet tone. All the works, particularly those running on bars, are fully employed; price concessions cannot be had from manufacturers, though close buyers can shade prices with dealers."

On the other hand, an interview is printed with one of the leading men of the Rhenish-Westphalian district, in which he says: "The reserve that was noted in the trade six or eight weeks ago as the result of the political uncertainties and caused a slight reduction in October in the volume of orders with the great establishments, has now given way before the heavy foreign demand. Orders arrivng from India have filled the books of Belgian steel works and caused them to raise their prices for bars by rapid steps to £6 a ton. The offers of German works in Brussels were quickly taken up at 121 marks f. o. b. net Antwerp, and finally bigger orders were taken at 122 marks. At this price the demand was heavier than the supply, and in view of this fact it is confidently expected that a further advance of several marks will be made within a few days. According to good information 30,000 to 40,000 tons of bars has been ordered within the past few days in Brussels. The chief cause for the hardening of prices lies, apart from the demand for East India, in the heavy requirements for Japan and South America. This has recently caused an advance of 2 to 5 marks in freight rates. The price for heavy plates for export has risen; great export houses expect further big orders for this product and another price advance."

The Pig Iron Trade

At the general meeting of the Pig Iron Syndicate on Friday the management reported that the calls for delivery of all grades were so urgent that the wishes of customers could not in all cases be met. Shipments in October exceeded the allotments by 3.5 per cent., as against 3.7 per cent. for September. Selling since business was opened at the end of October has been very lively; and by far the greater part of consumers have already provided for their requirement for the first half of next year. The amounts contracted for are so great that the furnaces will probably be able to sell the full amount of their allotments for the first half of 1913. The foreign demand is active at rising prices.

It continues to be reported that pig is scarce, and the scarcity has been rendered more acute by the shortage of cars. Further cases of the banking of furnaces in consequence of the scarcity of coal, coke and ores have been mentioned. For the same reason stocks of pig have somewhat accumulated at the furnaces in the past week or two. In the Luxemburg-Lorraine district the first quota of pig liberated by the Syndicate was speedily absorbed owing to the heavy foreign demand, and a further quota has been declared open for order. In that district supplies at the furnaces have been further reduced. The ore market remains firm, with foreign material still tending upward.

Finished Iron and Steel

The market for heavy plates is somewhat quieter. Dealers are deferring contracts in expectancy of easier prices after several important establishments shall have begun turning out plates on new mills now nearing completion. Not less than five concerns are mentioned as preparing to come forward soon with considerably larger supplies of heavy sizes. In view of this fact the price of plates has given way 2 to 3 marks. The October shipments of the Ship Plate Kontor amounted to 33,000 tons, against 26,000 tons for September. Orders in hand November 1 amounted to 243,800 tons. In thin plates, too, orders are coming in more slowly, but the mills have work ahead for three months or more.

Wire rods are still in heavy demand in both home and foreign markets. Work in tubing proceeds at the previous pace; there is a considerable new demand. From the Luxemburg-Lorraine district it is reported that somewhat better prices have been obtained for plain and galvanized gas pipe. The Mannesmann Tube Works, of Düsseldorf has just decided to raise its capital 16,000,000 marks to a total of 61,000,000 marks. The increase is for the purpose of acquiring the Königin Elisabeth coal mine. It was stated at the meeting of the directors that the deliveries of tubing by the concern and its allies from July 1 to October 31 amounted to 8,500,000 marks more than last year.

The movement in the Belgian market this week is again conflicting. Six days ago an advance on fine sheets for export of one shilling was reported, and at the same time heavy and medium plates for export lost 2 shillings. Two days later a dispatch mentioned a drop of 2 shillings a ton on export orders for steel bands and a similar drop on steel and iron bars. On the other hand, another advance on the home price for pig of one franc was reported yesterday, and to-day a dispatch from Brussels states that the Belgian Steel Association has raised the price of half-rolled material for the home market 3.50 francs for the first quarter of 1913.

The upward movement in the French market has just made a considerable step forward. According to a dispatch from Lille the association of basic steel works adopted an advance of 10 francs a ton on all half-rolled material, to take effect January 1.

New York

NEW YORK, December 11, 1912.

Pig Iron.—Business has been light in the past week and the prospect is that this condition will continue into January. At the present level of prices consumers seem not to be interested in contracting, though there are exceptions to the rule. Some cases are reported in which orders have been placed for shipment in the second, third and fourth quarters of next year. In the New York district inquiries are still pending for a total of 1800 tons for a railroad supply company having plants in various parts of the country. Another consumer has sent out an inquiry for 300 tons, which may result in placing contracts of that size with several sellers. At Buffalo the market is firm, and while shipments are being made regularly into New England and this district on contracts, new sales for eastern delivery are not numerous. Eastern Pensylvania furnaces are maintaining the prices recently asked, which in most cases are $17.50 at furnace for No. 2X for delivery in the first quarter, and $17.75 for the second quarter. One view of the market is that the quiet period, which is expected to continue into January, will be followed by another considerable buying movement, and that meantime there will be little or no change in prices. We quote as follows for Northern iron at tidewater: No. 1 foundry, $18.50 to $18.75; No. 2 X, $18.25 to $18.50; No. 2 plain, $17.75 to $18. Southern iron is quoted at $18.75 to $19 for No. 1 foundry and $18.50 to $18.75 for No. 2.

Structural Material.—The week has seen a continuance of a closing of contracts of good size and since last report information has been received of over 9000 tons closed in this market. Among these are the loft and store, Madison avenue and Thirtieth street, for Charles Kaye, to Mulcahy & Gibson, 3100 tons; the American Express building, 63 Broadway,

2200 tons, to Levering & Garrigues Company, which has also taken 325 tons for a Lehigh Valley pier in Jersey City; Stewart & Co., store addition, Baltimore, 1100 tons, to the American Bridge Company; bridges for the Boston & Maine, 400 tons, to the King Bridge Company, the McClintic-Marshall Construction Company and others; platform canopies, Lynn, Mass., for the Boston & Maine, 350 tons, to the Boston Bridge Works. Contracts have also been placed for the Winecoff Hotel, Atlanta, 550 tons, to Barber & Ross, Washington; country club, Alexandria Bay, 400 tons, to the Geurber Engineering Company, Bethlehem, Pa.; viaduct for the Raleigh, Charlotte & Southern, 750 tons, thought to have been awarded to the McClintic-Marshall Construction Company. One large and interesting project has developed at Boston, involving about 7500 tons; it is for a two-story pier, 400 x 1000 ft. in size, undertaken by the state of Massachusetts and intended to be erected as soon as possible. The New Haven Railroad is asking for bids on several bridges involving 400 tons. Competition among local fabricators appears to be quite keen. We quote plain material at 1.61c. to 1.86c., New York, for mill shipment, according to delivery, and 2.15c. from store.

Steel Plates.—Local demand still continues light and mills are catching up slightly, owing probably in part to the late cessation in railroad car buying. There is practically no new inquiry in the market for cars and the closures have not been large. The Pennsylvania Railroad has bought 3000 more cars, covering 1500 gondolas divided equally among the Pressed Steel Car Company, the American Car & Foundry Company and the Ralston Steel Car Company, and 1500 coke cars, 700 to the Cambria Steel Company, 200 to the American Car & Foundry Company and 600 to the Standard Steel Car Company. It is understood that the Canadian Pacific has contracted for 1500 freight cars, including 800 flat cars, 600 box cars and 500 ballast cars, with the Canadian Car & Foundry Company. Sheared plates are 1.66c. to 1.76c., New York, according to delivery, and universal plates are usually $1 per ton higher, but for delivery in the third quarter plates can be obtained for 1.61c., New York.

Iron and Steel Bars.—Bolts and nuts have been advanced, the discount on bolts being 2½ per cent. less and the discount on nuts being 10c. less. The advance does not affect coach and lag screws. Specifications on bar iron continue heavy and one mill has raised its price for orders placed in 1913 so that while business placed between now and the end of the year will be closed at the rate of 1.70c., New York, in carload lots, the price beyond December 31 will be 1.80c., New York, carload lots. Prompt business in steel bars seems still to be covered but the prices are variable and difficult to ascertain, as well as the identity of the mills capable of meeting the demands. Generally specifications for the month have already been made. Steel bars remain nominally 1.40c., Pittsburgh, or 1.56c. minimum, New York, mill shipments, and from store 2c. Refined iron bars are 1.70c. to 1.75c., New York, and from store, 2c.

Ferroalloys.—The quotation for 80 per cent. ferromanganese, second half delivery, is $65, Baltimore. For the first half, now near at hand, prices quoted range up to $70 and the amount available is limited in some quarters. Spot is unchanged at $75. While the market is as firm as ever the higher prices have made consumers hesitant about coming forward and quiet prevails. Some representatives of English producers are practically out of the market so far as the first half is concerned, and a case is known where a producer declined to undertake delivery on 500 tons for either the first half or third quarter. For 50 per cent. ferrosilicon there are several inquiries of good size, and quotations are unchanged at $75 for carloads, $74 for 100 tons and $73 for 600 tons or over.

Cast Iron Pipe.—A Delaware River maker was the successful contestant for the contract let by New Bedford, Mass., for 630 tons of 4 to 16 in., on which bids were opened December 4. The price is understood to have been close to $25.50 per net ton, delivered. No new public lettings of importance are announced in this part of the country. Considerable talk is current of the purchase in the near future of a large quantity of 36-in. flexible pipe by the Aqueduct Board of New York City, but nothing definite is yet known. A large quantity of good sized pipe is also likely to be bought in the near future for a water supply in the vicinity of Rochester, N. Y., but so far this proposition has not taken material form. Nothing new has developed with regard to private buying, but it is understood that figures submitted on large inquiries last week are under consideration. Quotations on carload lots of 6 in. range from $24.50 to $26 per net ton, at tidewater, according to the condition of makers' order books.

Old Material.—The market is drooping under the weight of heavy stocks in the hands of steel companies, rolling mills and dealers. The large consumers in the East all seem to be as well supplied with old material as reported last week, and it is more difficult to find any of them willing to receive deliveries on contracts. The foundry trade is the only bright spot by comparison, as the movement of cast scrap continues quite free with a steady volume of daily business. Dealers' quotations are nominal under the circumstances, being about as follows per gross ton, New York and vicinity:

Old girder and T rails for melting	$12.00 to $12.50
Heavy melting steel scrap	12.00 to 12.50
Relaying rails	22.50 to 23.00
Rerolling rails	14.00 to 14.50
Iron car axles	24.00 to 25.00
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	13.75 to 14.25
Wrought iron track scrap	13.00 to 13.50
No. 1 yard wrought, long	12.50 to 13.00
No. 1 yard wrought, short	12.00 to 12.50
Light iron	5.50 to 6.00
Cast borings	8.50 to 9.00
Wrought turnings	9.00 to 9.50
Wrought pipe	11.00 to 11.50
Old car wheels	15.00 to 16.00
No. 1 heavy cast, broken up	12.00 to 12.50
Stove plate	9.75 to 10.00
Locomotive grate bars	9.00 to 9.50
Malleable cast	11.50 to 12.00

Boston

BOSTON, MASS., December 10, 1912.

Old Material.—Prices have weakened again, with a dull market. Dealers report a tendency of buyers to proceed carefully in placing orders for future requirements. New England mills are busy, and, as far as can be learned, are confident of a continuance of present prosperous conditions, but a large proportion of the scrap produced in this territory is consumed elsewhere. The quotations given below are prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$11.75 to $12.00
Low phosphorus steel	14.00 to 15.00
Old steel axles	15.00 to 15.50
Old iron axles	23.00 to 23.50
Mixed shafting	14.00 to 14.25
No. 1 wrought and soft steel	11.75 to 12.00
Skeleton (bundled)	10.00 to 10.25
Wrought iron pipe	10.50 to 10.75
Cotton ties (bundled)	10.00 to 10.25
No. 2 light	4.50 to 5.00
Wrought turnings	8.00 to 8.25
Cast borings	7.75 to 8.00
Machinery, cast	13.50 to 14.00
Malleable	11.00 to 11.50
Stove plate	9.00 to 9.50
Grate bars	8.00 to 8.25
Cast-iron car wheels	13.50 to 14.00

Metal Market

NEW YORK, December 11, 1912.

The Week's Prices

Cents per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
Dec.	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
5	17.75	17.50	49.35	4.35	4.20	7.40	7.25
6	17.75	17.50	49.25	4.35	4.20	7.35	7.20
7	17.75	17.50	.....	4.35	4.20	7.35	7.20
9	17.75	17.50	49.55	4.35	4.20	7.35	7.20
10	17.75	17.50	49.25	4.35	4.20	7.35	7.20
11	17.75	17.50	49.25	4.35	4.20	7.35	7.20

Copper continues quiet, wth price concessions still obtainable. Tin is lower and quieter. Lead is dull but steady. Spelter is lower and weak. Antimony is still unsettled because of the offerings of resale lots at lower prices.

New York

Copper.—The market continues dull, with no special desire to either buy or sell. Prices are on the basis of 17.50c., cash, New York, for electrolytic, and 17.75c., cash, New York, for Lake, but they can be shaded at least five points for prompt delivery, while for far off positions even better can be done. Electrolytic for future delivery could probably be obtained at 17.37½c., cash, New York, from sources outside of the usual channels of supply and which are only occasional fac-

tors as sellers. The Copper Producers' statement, issued December 9, and which showed a gain in surplus of 9,419,095 lb., is generally regarded as favorable to sustained prices in view of the fact that a very much heavier increase in stocks was expected. The showing by the statement of nearly 56,000,000 lb. in exports in November far exceeded other compilations of export figures. The price of copper in London to-day is £75 12s. 6d. for spot and £76 12s. 6d. for futures. The exports this month were 8076 tons.

Pig Tin.—As was anticipated in the report of a week ago, the London decline in the price of tin then mentioned stimulated an excellent activity on December 4 which resulted in the buying of a rather heavy tonnage, though not as much metal changed hands as in similar previous movements. The buying was almost entirely for future positions and it soon subsided. The market was then quiet until yesterday when there was fair buying of futures, although it was curtailed by the lack of sellers willing to let their metal go at the market price. Outside of the two days mentioned, the market has been very quiet. It is known that London has sold very large quantities of tin at high prices, some of it for delivery as far forward as May, and there is some speculation at present as to whether London will let prices drop with an intention of at least attempting to buy back some of the metal it sold at the higher levels. Tin is quoted in New York to-day at 49.25c. and in London at £225 for both spot and futures. The arrivals this month total 1080 tons and there is afloat 1666 tons.

Tin Plates.—The jobbing demand for tin plates is tapering off, but the booking of orders from the can makers for their second quarter requirements is now under way. Prices are unchanged, but the trade holds that they are too low and declares that the situation demonstrates what an absolutely open market exists in the tin plate field.

Lead.—The lead market has been uniformly dull but steady. At present it lacks trend one way or the other and little can be said of it. Prices are unchanged at 4.35c., New York, and 4.20c., St. Louis. Independent sellers are hesitant about going below these prices, but there is tendency that way.

Spelter.—The demand is very quiet. The market is weaker at 7.35c., New York, and 7.20c., St. Louis.

Antimony.—This metal is dull and the interest in its market continues to be offerings of resale lots at considerably below the import cost. For Cookson's 10.25c. is quoted, for Hallett's, 9.50c. and for Chinese and Hungarian grades, 9.25c., but prices are subject to considerable variation because of competition among the sellers. In some cases consumers are pleading the fear of tariff revision fixing lower duties for antimony as was proposed in the Underwood metal tariff schedule as a reason for not buying, and in at least one instance a clause is being placed in contracts which will insure to the buyer any advantage that may come from such revision.

Old Metals.—The usual end of the year condition prevails. Very little is doing. Dealers' selling prices are nominally unchanged as follows:

	Cents per lb.
Copper, heavy and crucible	17.00 to 17.25
Copper, heavy and wire	16.50 to 16.75
Copper, light and bottoms	15.00 to 15.25
Brass, heavy	10.50 to 10.75
Brass, light	8.50 to 8.75
Heavy machine composition	14.00 to 14.25
Clean brass turnings	9.75 to 10.00
Composition turnings	12.50 to 13.00
Lead, heavy	4.75
Lead, tea	4.50
Zinc, scrap	6.25

Chicago

DECEMBER 10.—Although fluctuating to both lower and higher levels during the week, tin quotations at this writing are approximately the same as a week ago. The copper market has in it indications of considerable buying strength, but as yet prices are unaffected. Lead quotations are slightly lower, and spelter prices show possibilities of being shaded. We quote as follows: Casting copper, 17.62½c.; Lake, 17.75c. to 18c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 50.50c.; small lots, 52.50c.; lead, desilverized, 4.35c. for 50-ton lots; corroding, 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7.40c. to 7.50c.; Cookson's antimony, 11.25c., and other grades, 10.50c. in small lots; sheet zinc is $9, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 15.50c.; copper bottoms, 14c.; copper clips, 15c.; red brass, 12.75c.; yellow brass, 10c.; lead pipe, 4c.; zinc, 5.50c.; pewter, No. 1, 33c.; tinfoil, 39c.; block tin pipe, 45c.

St. Louis

DECEMBER 9.—The metal market has been rather quiet with something of a sagging tendency, especially in lead and spelter. The quotations to-day on lead are 4.20c. to 4.25c.; spelter, 7.20c. to 7.25c.; Lake copper, 17.97½c. to 18.22½c.; electrolytic copper, 17.87½c. to 18.12½c.; tin, 49.60c. to 49.87½c.; antimony, Cookson's, 10.50c. In the Joplin ore market there was a slight weakening in the demand for second grade ores and the basis price for zinc blende ranged from $54 per ton upward. The choicest grades sold on a basis of $58, with the top quality lots bringing $61. The general market was about as strong as during the preceding week. Lead ore was practically unchanged at $54. Calamine was in good demand at $29 to $33 for 40 per cent., with the choicest grades bringing as high as $38. On miscellaneous scrap we quote as follows: Light brass, 6.50c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 13c.; zinc, 4c.; lead, 3.50c.; pewter, 25c.; tinfoil, 32c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, December 11, 1912.

Liquidation, sometimes violent, has been the feature of the past week in all kinds of securities. Some of the stocks of companies manufacturing paper declined abruptly last Wednesday, thus beginning the downward movement, and on subsequent days the tightness of money and other unfavorable developments carried down prices of all kinds of securities, whether gilt edged or of less certain value. Favorable conditions were completely ignored, while anything of an adverse character was given more than its just consideration. Some improvement occurred yesterday. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com.	26 - 37⅛	Pittsburgh Steel, pref.	100
Am. Can, pref.	113 -122⅞	Pressed Steel, com.	33½- 36¾
Am. Car & Fdy., com.	54¾- 59¼	Pressed Steel, pref.	98 -101
Am. Car & Fdy., pref.	117¾-118½	Railway Spring, com.	34 - 36½
Am. Loco., com.	41¼- 45½	Railway Spring, pref.	100 -101⅜
Am. Loco., pref.	106½-107	Republic, com.	23½- 27
Am. Steel Foundries	34½- 37½	Republic, pref.	85 - 89½
Bald. Loco., com.	49 - 54½	Rumely Co., com.	92 - 95½
Bald. Loco., pref.	106½-107	Rumely Co., pref.	100½-102¼
Beth. Steel, com.	33⅝- 38¾	Sloss, com.	45 - 48½
Beth. Steel, pref.	60½- 68½	Sloss, pref.	97
Case (J.I.) Co., pref.	100½-101½	Pipe, pref.	57 - 59½
Colorado Fuel	29¾- 35½	U. S. Steel, com.	64⅛- 73
Deere & Co., pref.	101	U. S. Steel, pref.	107¼-110⅞
Emer-Brant, com.	68 - 74	Va. I. C. & Coke	57 - 62
Emer-Brant, pref.	98 - 99¾	Westinghouse Elec.	76¼- 81
General Electric	181⅞-185	Am. Ship, com.	53 - 58
Gr. N. Ore Cert.	40 - 45	Chic. Pneu. Tool	47 - 53
Int. Harv., com.	109½-119½	Cambria Steel	48¼- 49
Int. Harv., pref.	114½-115	Lake Sup. Corp.	29¾- 31¼
Int. Pump, com.	17 - 24	Pa. Steel, pref.	94
Int. Pump, pref.	74 - 78¼	Warwick	10¼
Lackawanna Steel	46½- 49¾	Crucible Steel, com.	15¼- 16½
Nat. En. & St., com.	16½- 19¾	Crucible Steel, pref.	94¼- 97
Nat. En. & St., pref.	91½	Harb. Wk. Ref., com.	50½- 51⅛

Dividends Declared

The Ingersoll-Rand Company, semi-annual, 3 per cent. on the preferred stock, payable January 1.

The International Harvester Company, regular quarterly, 1¼ per cent. on the common stock, payable January 15.

The American Can Company, quarterly, 1¾ per cent. and extra one-fourth of 1 per cent. on the preferred stock, payable January 1. This declaration begins the payment of the full 7 per cent. on the preferred stock and of the dividends which have accrued.

The Great Northern Iron Ore Properties, 50c. per share, payable December 27. The last previous dividend was 50c., declared in February, 1911.

The Youngstown Sheet & Tube Company, regular quarterly, 2 per cent. on the common and 1¾ per cent. on the preferred stock, payable January 1.

The Empire Steel & Iron Company, Catasauqua, Pa., 2 per cent. on the preferred stock, payable January 1. The last dividend paid was 1 per cent. in July, 1911. Accumulated dividends on the preferred stock amount to 29½ per cent.

The No. 2 blast furnace of Worth Brothers Company, Coatesville, Pa., which has been practically completed for a good many months, was blown in December 4. It is of the same size as the No. 1 furnace, 21 x 85 ft., and has a capacity of 450 tons of basic pig iron a day.

Personal

Henry D. Sharpe, president, and Robert Wuest, commissioner of the National Metal Trades Association, will be the guests of F. F. Beall, factory manager of the Packard Motor Car Company, Detroit, Mich., at the Detroit Club at luncheon December 13. At that time they will be given an opportunity to meet a number of prominent Detroit manufacturers.

Thomas Devlin, president Thomas Devlin Mfg. Company, Philadelphia, Pa., also president of the Philadelphia Foundrymen's Association, attended the Deeper Waterways Convention in Washington, D. C., last week as a delegate under appointment by the Governor of Pennsylvania, the Governor of New Jersey and the Mayor of Trenton, N. J. He also represented the Philadelphia Foundrymen's Association.

Dr. Wilhelm Schumacher of Berlin, who has been in this country for the last six weeks in the interest of the General Briquetting Company, has returned to Germany.

W. H. Sylvester, who has been connected for several years with the Southwark Foundry & Machine Company, Philadelphia, Pa., has resigned his position as general foreman.

James V. Peterka has been appointed chief mechanical engineer of the Indiana Harbor Works of the Inland Steel Company, at Indiana Harbor, Ind. He will be assisted by Ole Stenbakken, construction engineer; Benjamin Burrell, master mechanic; Frank Warner, assistant master mechanic, and William Potts, shop foreman. Mr. Peterka was formerly general master mechanic.

J. P. Moore, formerly of the Wyandotte Construction Company, Kansas City, Mo., has accepted a position with the engineering department of the Westinghouse Electric & Mfg. Company and will engage in railroad electrification work. He was formerly instructor in electric railroad engineering at State College, Pa., and while there contributed to the technical press.

Wallace Downey, president Downey Shipyard & Marine Company, Brooklyn, N. Y., arrived from Bermuda, December 5, with a contract for the construction of a steamboat for the Bermuda Transportation Company, to ply between Hamilton and St. George, the two chief ports on the island. The boat will carry 900 passengers and have space for freight. Mr. Downey built the German Emperor's yacht Meteor.

L. H. Mesker, manager of the St. Louis branch of Manning, Maxwell & Moore, Inc., has resigned his position and will be connected in a similar capacity with the Ferro Machine & Foundry Company, Cleveland, Ohio, after January 1.

Guy E. Tripp, chairman of the board of the Westinghouse Electric & Mfg. Company, Pittsburgh, has returned from a trip to Europe. He spent about three months in inspecting foreign plants of the company.

W. Park Starr has been made assistant superintendent of the bar and plate mills at the Lansingville plant of the Republic Iron & Steel Company, Youngstown, Ohio. Donald H. Gordon, who previously held the position, has been transferred to the sales department.

W. A. Luttrell, formerly with the Standard Steel Works, Burnham, Pa., has been appointed superintendent of the foundry of the Otis Steel Company, Cleveland, Ohio, succeeding E. H. Davis, resigned. W. A. Riddell, who recently became connected with the Otis Company, is general superintendent of the foundry department. On his retirement a few days ago Mr. Davis was presented with a gold watch and chain by employees of the company.

Herbert B. Cox, formerly of the Empire Steel & Iron Company, has returned from a nine months' tour abroad in which he visited a number of iron and steel properties and made a study of mining operations in Italy. His address for the present is Calais, Maine.

Peter Eyermann, formerly of Dubois, Pa., who is now on the engineering staff of the Witkowitzer Bergbau & Eisenhütten Gewerkschaft, Witkowitz, Austria-Hungary, read a paper on "American Iron and Steel Works" before the Oesterr. Ingenieur and Architeklen Verein November 25.

Henry E. Elrod, consulting and constructing engineer, has opened offices in the Southwestern Life Building, Dallas, Texas, specializing on inspections, reports, bridges, municipal works, etc.

C. H. Ellis, formerly with the sales force of the Tabor Mfg. Company, Philadelphia, Pa., is now associated with Henry E. Pridmore, Chicago, manufacturer of molding machines. Mr. Ellis is to be associated with the sales department, with headquarters at Buffalo.

Obituary

GEORGE ROLLINGS, superintendent Pittsburgh Malleable Iron Company, died November 30, at his home at Crafton, Pa., after a comparatively short illness, aged 56 years. He was born in Pittsburgh. In early manhood he entered the plant of the McConway & Torley Company, Pittsburgh, and it was not long before he became superintendent of the works. He remained with the company until he organized the firm of George Rollings & Co., which later became known as the Pittsburgh Malleable Iron Company. He was a director in the First National Bank of Crafton and the First National Bank, of Bridgeville, Pa. Much of his time was devoted to charitable and religious work.

ELIAS CRANDALL, vice-president Globe Iron Company, according to an announcement just issued by the company, died at Jackson, Ohio, September 16. He is said to have been the oldest man actively engaged in the furnace business at the time of his death.

DAVID D. DEMAREST, Angels, Cal., died November 22, aged 88 years. He was a native of New Jersey, went to California in 1849, and in 1861 started the Angels Iron Works, a foundry and machine shop, now operated by his son, C. D. Demarest.

Pittsburgh and Vicinity Business Notes

The Standard Chain Company, Pittsburgh, whose plant at Carlisle, Pa., was destroyed by fire some time ago, has leased the building formerly occupied by the Cooper Heater Company and installed 70 forges, which are now in operation. The building is 300 ft. long and 75 ft. wide.

The Aluminum Company of America, Pittsburgh, Pa., is making investigations at Chattanooga and Knoxville, Tenn., with reference to the location of a plant which will depend upon the railroad and power facilities available. The company has contracted for a considerable block of power, extending over a period of years, to be supplied by the Tennessee Power Company. The company's chief requirement is cheap power, it is stated, and the location of the plant will be influenced by conditions which will best meet this requirement.

Mackintosh, Hemphill & Co., Pittsburgh, announce that they will have ready for inspection at their works on Twelfth and Etna streets, December 14 to 17, a twin, tandem-compound, direct connected reversing engine which is to be installed in the new open-hearth steel plant of the Pittsburgh Crucible Steel Company at Midland, Pa. It is almost a duplicate of an engine furnished by the same builders several years ago to the Carnegie Steel Company's Duquesne works and which has given splendid service, the variation being that the valve chests on the Midland engine are on the side of the cylinders and the steam piping is overhead. The engine, which is designed to operate under a steam pressure of 150 lb. per sq. in., and to develop, efficiently, at 100 r.p.m., 20,000 hp., has high pressure cylinders 44 in. in diameter, and low pressure cylinders 70 in. The stroke of the engine is 60 in. and it is designed to run at 100 to 150 r.p.m. The link motion is of the Stephenson type, with variable cut-off.

The Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, has received contracts for the last of the piping for the power plant of the American Sugar Refining Company at Brooklyn, N. Y., which include blow-off, drainage and stoker engine piping. It is also completing contracts for large power houses at Fraser, Iowa, and Aliquippa, Pa. In the latter, interlock welded necks are used throughout in place of fittings, and the company's

Atwood line weld reduces the number of flange joints. The design of the drainage system is especially noteworthy for its completeness. Among other new contracts for piping are some for power houses at Culver, Pa., Binghamton, N. Y., and Stellerton, Nova Scotia. The company is having a good demand for the Aiken operating valves, one order from the Tennessee Coal, Iron & Railroad Company calling for 42, from 1 in. to 3 in. in size. Another recent contract calls for two 8-ft. motor-operated butterfly valves for the Tennessee Power Company, Ocoee, Tenn.

The Jamison Coal & Coke Company, Greensburg, Pa., has placed a contract with the Jeffrey Mfg. Company, Columbus, Ohio, for 12 mine locomotives and 30 mining machines, and with the Pittsburgh Electric Machine Company, Pittsburgh, an order for a switchboard for the control of the current at the power plant.

The Lawrence Steel Construction Company, Pittsburgh, has been awarded the contract for the erection of the new buildings for the plant of the Wheeling Sheet & Tin Plate Company, to be erected on the Ohio side of the Ohio River, near Wheeling, W. Va. The buildings will be of steel and brick construction, the main mill building to be 250 x 400 ft.; tin house and warehouse, 150 x 400 ft.; boiler house, machine shop and storage buildings, each 50 x 125 ft. The Fort Pitt Bridge Works, Pittsburgh, had the contract for the structural steel, about 1500 tons, and furnished the fabricated material within three months from the date of contract. This is considered a very good record, in view of the difficulty in obtaining deliveries of structural steel.

A new company, to be known as the Continental Can Company, is to be organized, to take over the business of the Continental Can Company, a New Jersey corporation, the Export & Domestic Can Company, a new corporation, and the Standard Tin Plate Company, Canonsburg, Pa. The authorized capitalization of the new company is to be $7,500,000 7 per cent. cumulative preferred and $10,000,000 common, of which there are to be presently issued $5,500,000 preferred and $8,000,000 common.

The American Society of Engineer Draftsmen will hold its next monthly meeting on the evening of December 19 in the Engineering Societies Building, 29 West Thirty-ninth St., New York. A paper on "Rational Design of Machines" will be presented by Prof. Walter A. Rautenstrauch, and a lecture will be given on "The Relations of the Engineer and the Draftsman," by Prof. F. R. Hutton, both of Columbia University.

Improvements now under way by the La Belle Iron Works, Steubenville, Ohio, consist of one 50-ton open hearth furnace, making 11 in all; 1000 hp. to the boiler plant; feed-water heating and treating plant; three turbine-driven centrifugal feed pumps; scrap bundling machine and plant, and various cranes and crane runways. The total cost of these improvements will be about $225,000.

The low-pressure steam turbines for utilizing exhaust steam from hammers in drop forge plants, as mentioned in an article in the issue of December 5, are being furnished for the two installations covered in the article, that of the Transue & Williams Company at Alliance, Ohio, and the Canton Drop Forge & Mfg. Company at Canton, Ohio, by the De Laval Steam Turbine Company, Trenton, N. J.

The State Harbor Board of California at San Francisco has approved a contract with the Baldwin Locomotive Works for a locomotive for the local belt railroad, and let a contract for steel rolling doors for piers 26 and 28 to the Lilley & Thurston Company, San Francisco, at $49,125.

The Chicago Foundrymen's Club, at its next meeting to be held at Lewis Institute, Saturday, December 14, has arranged for the presentation of the Rogers, Brown & Co. series of moving pictures illustrating the iron business from the mining of iron ore to the production of castings.

The Juniata Furnace & Foundry Company, Newport, Pa., will blow in its Marshall furnace December 14.

Mutual Liability Insurance

The economic waste resulting from litigation under previous methods of handling accident cases has resulted in the assumption by several States that each industry should bear its proportion of loss due to this cause. Impelled by a wave of socialistic sentiment, many States have passed laws making employers liable for injuries, irrespective of negligence or other contributory cause. Other States are falling into line.

The condition was formerly met by stock liability insurance companies operated at a cost, including brokers' commissions, of about 50 per cent. of the premiums. Only 45 per cent. of the total payments by the employers was distributed for compensation, and most of that 45 per cent. was gobbled up by unscrupulous lawyers who handled the individual workmen's cases. Recognizing the great principles back of the mutual insurance idea, as worked out so successfully in connection with fire insurance in the New England "factory mutuals," a mutual company was formed several years ago to get for its members lower liability insurance cost than was otherwise possible. Operating without any capital stock, and therefore without need for making provision for dividends; operating also without insurance brokers, with their commissions running as high as 30 per cent. on the premiums, this company's growth has been slow but sure, being based mainly upon acquaintanceship between its several members and other concerns which have come in later.

It has been found possible, by working along these lines, to reduce the expense to less than 20 per cent. of the total premiums paid in. The further great benefit shows up at the end of the year in the shape of a return premium, which for several years has been 20 per cent.

Now that the New York, Massachusetts and other workingmen's compensation acts are in full swing the subject is one of increasing importance, and is being brought home forcibly to all employers of labor. The inevitable result will be to increase largely the expense of all liability insurance. This is due to the liberal guarantees which the law gives the workingman, and to the fact that all laborers come under the operation of the act.

Compensation must be assured or it becomes an empty right and a useless remedy. If it is dependent upon the solvency of the employer the position of the employee or the small employer may be precarious. Insurance alone insures solvency, guarantees recovery to the workmen and lessens the burden on the employer. Under the new compensation acts every employer of labor must satisfy the proper authorities that payment of the prescribed compensation is assured to his employees through a well-recognized and adequate method. Any one of the following four methods might be used:

1. The employer's own financial standing could be made liable for losses (not in Massachusetts, except under severe restrictions).

2. Liability insurance department or company organized and maintained by the State.

3. Insurance in private liability insurance companies approved by the State.

4. Insurance in mutual insurance associations or companies approved by the State.

By using the greatest care and discrimination in the selection of risks, a policy which was adopted at the start and has been continued ever since, the company in question reports annual return premiums much larger than would be possible to any company writing all the risks it could get.

The inspection of a member does not end with the careful selection of the risk. An inspection department is maintained, which makes a study of the means taken to prevent or minimize accidents. This department makes recommendations for the improvement of conditions, and all members are strongly urged to make the changes called for, with the dual purpose of rendering their own plants safer for their men and of permitting the company to pay them and the other members a higher return at the end of the year, through the fact that losses or accident payments are made a minimum.

Incidentally, the fact that a plant is thus safeguarded, both by connection with a company of this sort and by the provision of safety appliances, will also attract to the employ of that company the highest grade of workmen—men with a regard for careful and conscientious work.

American Society of Mechanical Engineers

(*Continued from page 1387*)

the new management, and in the refusal of those working under the changed conditions to join in a strike of their fellows in the same plant who were not working under the new methods. This last-mentioned situation has arisen a number of times. In one case an attempt was made to strike a room where about one-half of the operators were under the new conditions. These refused to go out; the rest went.

These results indicate certain advantages to both employer and employee. But it is charged that the movement has not yet entirely justified itself from the economic viewpoint, for it has not reduced the cost of product to the consumer. The implication is that its possibilities will not be realized until employers, employees and the public are alike benefited. With this view we are in most hearty accord. Labor-saving machinery has brought the comforts that we all enjoy to-day. Labor-saving management promises to extend those comforts. Where properly administered it is conserving labor and is thus contributing to the good of society at large, and, although the benefit to the consumer may not yet be generally felt, it has already developed to a certain extent and will continue to develop as the natural result of increased production.

The Discussion

A large number of written discussions was submitted. The first contribution was from Charles B. Going, managing editor The Engineering Magazine. He regarded the report as argumentative and supporting a theory rather than outlining the direction which progress is taking. Progress in operating and manufacturing activities, he said, is taking place under the influence of four philosophies: coercion, incentive, scientific management in the titular sense, and suggestion. Halbert P. Gillette, managing editor Engineering-Contracting, laid claim to an early recognition of the possibilities of science in management. He paid a high tribute to A. M. Wellington, whose writings showed that he apprehended a good deal of the principles now so widely discussed. A. Hamilton Church, Patterson, Teele & Dennis, New York, complimented the committee on the clear cut picture of the "transference of skill" and the need of the study of the machine tool. Manufacture had emerged from the stage of indifference to one of self-consciousness.

Prof. C. B. Thompson, Harvard University, considered that the enhanced value due to the modernized methods of factory operation were not fairly divided between employer and employee, but he felt that the time was coming when labor organizations would demand modernizing on their own account, as can be seen in the present-day demands for sanitation, satisfactory lighting, etc. H. M. Wilcox, Miller, Franklin & Co., New York, could not see the value of employing the term "labor-saving" when economies are effected in design and not alone labor. He suggested also the need of more attention to what may be called the purchasing agent for labor just as we have at the present time an individual charged with the duty of purchasing material. H. L. Gantt argued for the democratic spirit rather than the autocratic in dealing with employees; that no great advance could be expected so long as brute force was employed, for when the employer follows such practices, he can expect the labor organization to do likewise.

Motion Pictures for Time Studies

John G. Aldrich, vice-president and general manager, New England Butt Company, illustrated by means of the lantern photograph what many regarded as the most important development made for some time in the movement to bring about science in management. It covered the application of the motion picture machine for securing time studies. One important feature is the use in the field of the camera of a special clock face having a hand which makes a complete revolution in 6 seconds. The divisions of the circumference traversed by the end of the hand correspond to 0.001 minute, so that readings can be taken to one-half thousandth of a minute. With the use of an eye glass similar to the instrument used by the watch repairer, one may examine the motions of an operator without projecting the films of the photographic machine on the screen.

Mr. Aldrich, who said that the use of the motion picture machine in time studies had been designated as micro-motion study, exhibited some pictures showing how it had been used and told of the remarkable improvements made in a short time in the operation of the assembly of machines made up of numerous small parts. These comprehended in part the use of wall racks with pegs for suspending near the workmen the parts to go into a machine, the parts being arranged both in regard to sequence of need and rhythm of the worker's motions. It is hoped later to give in some detail the experiences with this new development, which Robert T. Kent in the discussion praised in unqualified terms. He explained how in a week's time a given operation was reduced from 30 min. to 7 min.

Need of Formulated Psychology of Management

F. A. Waldron, industrial engineer, New York, explained a chart he had devised to show relations among labor, material, expense and profit items. Frederick W. Taylor, the discoverer of scientific management, commended the novel presentation of the committee's transference-of-skill idea and agreed that with the introduction of labor-saving machinery, the labor itself did not at first profit by the surplus created, although later such was the case.

F. G. Coburn, League Island Navy Yard, Philadelphia, expressed the need of rules in respect to the psychic or psychological aspects of management; in other words, the rules that give to the superior the power to make a man do what he does not want to do, and yet make him like to do it. Carl G. Barth, consulting engineer, Philadelphia, expressed himself as an advocate of piece work, that such method of wage payment required carefulness in establishing rates, which was not so much the case with the bonus system. He was not sure that the values shown by the motion picture records could be satisfactorily interpreted.

The Engineer in the Field of Economics

Dr. Humphreys took exception to a statement of Professor Thompson that "the solution of the problem is not to be looked for from engineers. When the engineer wanders into the field of economics he makes the same spectacle as the economist would in the field of machine design." Dr. Humphreys asserted that the book economist has much to answer for, that he fails to look on all sides of the question, that he is not qualified by practical experience to reach sane conclusions. He did not hesitate to say that some of the most inefficient guides to national questions are certain of the professors of our colleges.

One participant in the discussion emphasized the need of intimate relations between heads of an establishment and foremen, and ventured to suggest that the Lawrence strike might have been prevented if the heads of the business could have been able to speak the names of the foremen. Permanency of employment he regarded as more of a factor at the present time than high cost of living. Too often a foreman is selected because he knows how to manufacture, and not necessarily because he may have some of the milk of human kindness. Oftentimes candidates for employment are inquired into as to condition of health and education, but one must see a man in harness to judge his worth. He asserted that the employer "loses the fun in business in disregarding the human element."

Prof. Hugo Diemer, professor of industrial engineering, Pennsylvania State College, presented a detailed model organization chart. Sanford E. Thompson, consulting engineer, Newton Highlands, Mass.; Tracy Lyon, director of production, General Motors Company, Detroit; Prof. Dexter S. Kimball, Sibley College, Cornell University, and Prof. Joseph A. Bursley, University of Michigan, also discussed the report. Professor Bursley asserting that the fact that one whole session of the society was given over to the subject was a decided victory for scientific management. He urged more attention to the subject in technical schools.

Prof. William Kent suggested that manufacturing came under three heads: 1, traditional or unsystematic; 2, transitory or systematized; 3, scientific or industrial management carried on in a scientific manner and involving

not merely labor saving, but fuel saving, capital saving, etc. He asserted that some factories to be run satisfactorily need to change the character of the product manufactured.

Henry H. Vaughan, assistant to the vice-president, Canadian Pacific Railway, Montreal, presented a minority report as a member of the sub-committee on administration. He agreed that each of the suggestions that have been made to improve methods of management may have merit, but he did not feel that any one of them is a panacea for all our inefficiency. For instance, in certain classes of work time studies are valuable, in others they may be a waste of time. In certain classes of work he considered piece-work or bonus systems desirable, in others he considered them inferior to day work. Functional management may be an improvement in certain industries, in others he did not consider it suitable. In some cases the workman can be trained by the skilled executive. He felt that labor-saving management is not any particular system, but will always remain the art of selecting and applying the most appropriate methods furnished by the science of management, the science that records what these methods are and the results obtained from them.

Some of the Other Papers of the Meeting

Case Carbonizing

A paper entitled "Case Carbonizing," was presented by Marcus T. Lothrop, Canton, Ohio. It was accepted in the discussion as a paper virtually creating a science of practices formerly not possibly so regarded and in this connection may be mentioned the article on "Time to Heat Up Carburizing Materials," presented in *The Iron Age* of October 17. Mr. Lothrop's investigations covered researches to determine the causes of irregularity of the product and the precaution which must be employed to secure uniform results. The experiments undertaken were to determine: The effect of heat treatment in case-carbonizing steels upon the physical properties of the metal. The effect of temperature used in case carbonizing. The effect of heat treatment after case carbonizing. The effect on the rate and depth of carbonization of the composition of the steel being case-carbonized. The efficiency of case-carbonizing materials. The rapidity with which heat is conducted through carbonizing materials. It is proposed to deal with the paper at length in these columns.

Measurement of Air and Water Flow

A paper on the measurement of air in fan work by Charles H. Treat, American Blower Company, Detroit, was well received, Mr. Carrier, emphasizing, for example, its great importance to the engineer interested in fan applications in heating, ventilation and light. It discussed the use of the pitot tube for fan testing with particular emphasis on the correct kind of tube to be used. It proved that the volume discharged from a fan is the same at all densities, other conditions being the same. The question of the average velocity of flow in a pipe was also discussed.

The V-notch weir method of water measurement was made a subject of a paper by D. Robert Yarnall, mechanical engineer, Yarnall-Waring Company, Philadelphia. The application of the V-notch for measuring condensation from a steam power plant, for example, has been utilized by the Harrison Safety Boiler Works, as mentioned some weeks ago in these columns. The apparatus comprehends the use of a float, the rise and fall of which corresponds to the depth of water passing over the weir. To the float is attached an indicator which may be calibrated to read directly the weight of water flowing over the weir and the rod rising from the float is also made to revolve a cam of cylindrical form having a groove from which by an ingenious arrangement the rise and fall of the float gives a continuous record on a paper covered drum. The question was brought out that the calibration might be affected by the varying temperature of the water. While for the same weight of water passing over the weir in a given time, the height of the water would be greater the higher its temperature, this fact is compensated in part by the greater submergence of the float in the hotter water. The author mentioned that investigations are being made to bring about true compensation by giving the float a shape which will add to the compensation provided in part by the greater submergence in the hot water.

A paper on "The Centrifugal Blower for High Pressures" was also submitted in this session devoted to fluid flow. Its author is Henry F. Schmidt, Westinghouse Machine Company. Differences of opinion in regard to the author's claims were brought out in the discussion but in his absence they remained without answer.

Standard Sizes of Catalogues

The committee on standardization of catalogues, William Kent, chairman, made the following recommendations in a preliminary report:

	In.
Index card, standard	3x5
Index card, larger sizes	4x6 and 5x8
Folders, small 6x3⅜	Large, 8x3½
Catalogue, standard size	6x9
Bulletins and large catalogues, standard	8x10½ and 8½x11
Bulletins and large catalogues smaller than standard	8x10½

For paper covered catalogues intended to be permanently filed, the edges, including the cover, shoud be trimmed to exact size. No fancy deckled edge or dark tinted paper should be used.

Overlapping edges of the cover are permitted when the catalogue is bound in covers stiff enough to support its weight in boards or heavy card paper.

The title should always be printed on the exposed back of the catalogue, even in very thin stitched books, for the purposes of identification.

Every catalogue should have a date on its title page. A standard size index card 3 x 5 in. should be enclosed in each catalogue, with the title of the book and a brief statement of the character of its contents printed on it.

Catalogues, extra large, and technical press	9x12

Standard Cross Sections and Symbols for Drawings

Decided differences of opinion developed on the presentation of the report of the committee on standard cross sections and symbols, H. de B. Parsons, consulting engineer, New York, chairman. This report attempted to standardize the cross section work of a drawing and other methods of orientation to indicate on a drawing what material is specified. It was felt that there was a great need for uniformity in the representation of metals, masonry work, concrete, etc., but it developed in the discussion, in which A. A. Adler, instructor of mechanical drawing, Polytechnic Institute of Brooklyn, and J. H. Norris, mechanical engineer, National Meter Company, Brooklyn, took part that simple cross lining would suffice in drawings, inserting the name of the material in lieu of practising a special form of cross lining for the special material. One of the arguments was that the report suggested a cross hatching for wrought steel and then in addition recommended the insertion of the words on the drawing with the same cross hatching in the cases of alloy steels, such as nickel steel, chrome steel and vanadium steel. Spencer Miller, Lidgerwood Mfg. Company, emphasized that after all the report, which is now printed in the December Journal of the society, allows a man to adopt the recommendations if he wants to and that there is, of course, no compulsion.

The Harbison-Walker Refractories Company, Farmers' Bank Building, Pittsburgh, Pa., has issued its tenth annual statement, this being for the year ended September 30, 1912. The statement presents a complete profit and loss account and a balance sheet. It shows that the net profit for the year, after deducting expenditures for repairs, depreciation, etc., was $1,321,689.76. After payment of interest on bonds, dividends of 6 per cent. on the preferred and 2 per cent. on the common stock, the net surplus for the year was $325,127.26. The balance sheet shows quick assets (inventories, accounts receivable, bills receivable and cash), $3,718,532.40; the current liabilities (accounts payable and pay rolls) were $251,496.59. The total surplus September 30 was $5,540,187.78.

The Newark Foundrymen's Association, Newark, N. J., at its monthly meeting held on the evening of December 4, did not have any selected speaker, but devoted the session to a discussion of the advisability of establishing a labor bureau to serve its members. No definite action was taken. G. Hanney, Oscar Barnett Foundry Company, president of the association, occupied the chair. The meeting was preceded by the usual dinner.

New Steel Pipe Price List

The New List Adopted by the National Tube Company and Other Manufacturers

The announcement in our issue of November 28 that on January 1, 1913, the National Tube Company, Pittsburgh, would put in effect a new price list on steel pipe with all weights figured on the weight of steel instead of iron, has created a good deal of interest in the trade. While the action is somewhat radical, it is believed that it will be of great benefit to the consumers of pipe. Since February, 1900, nearly all steel pipe has been made and sold at either merchant weight or full weight, but in the future it will be sold as full weight only. The making and selling of pipe on merchant weight allowed mills that were disposed to do so to lessen considerably the amount of steel in the pipe, particularly on sizes from 6-in. up, and on account of this the National Tube Company and other makers on February 1, 1910, issued an amended list of weights on 6-in. and larger pipe. This helped the situation to some extent, but did not entirely remove the trouble.

The National Tube Company has been working on the change from iron to a steel weight basis for some years so as to have it cover all sizes of pipe, and has finally been able to complete it, and, beginning January 1, will discontinue entirely the manufacture of merchant weight pipe and will make all black and galvanized steel pipe from steel weights. It is believed that this will mean a better quality of pipe for the consumer, as the wall thickness of the pipe will be increased, and under the new basing the proper weights will be assured in all cases.

Because of the fact that the pipe mills work to weights instead of thicknesses, as steel is a denser metal than iron, a cubic inch of steel weighing 0.2833 lb. and iron 2 per cent. less, all weights under the new system are increased and the new price lists are figured more closely to 10c. per lb. than formerly, while discounts remain the same, and this explains why the price per foot on certain sizes of both black and galvanized pipe has been advanced, while on other sizes it has been lowered. It should be noted that the usual variation in weight of 5 per cent. either way still applies on the new full weight card.

Some of the independent makers of pipe have already expressed their approval of the change from merchant to full weight, and it is believed that all of them will eventually adopt it. In fact, several pipe mills have had the new lists and discounts printed and state that on January 1 they also will make steel pipe to full weight only, based on steel weights, and will cease entirely the manufacture of merchant weight pipe. The makers of iron pipe adopted the new list last Friday, which was to be expected, having always furnished full weight.

Effective from January 1, 1913, the new Pittsburgh basing discounts on full weight steel pipe will be as follows on jobbers' carloads:

	Black.	Galvanized.
⅛, ¼ and ⅜ in., butt	73	52½
½ in., butt	77	66½
¾ to 3 in., butt	80	71½
2 in., lap	77	68½
2½ to 6 in, lap	79	70½
7 to 12 in., lap	76	65½
13 to 15 in., lap	53	....
Plugged and Reamed.		
1 to 3 in., butt	78	69½
2 in., lap	75	66½
2½ to 4 in., lap	77	68½
Extra Strong, Plain Ends.		
⅛, ¼ and ⅜ in., butt	68	57½
½ in., butt	73	66½
¾ to 1¼ in., butt	77	70½
2 to 3 in., butt	78	71½
2 in., lap	74	65½
2½ to 4 in., lap	76	67½
4½ to 6 in., lap	75	66½
7 to 8 in., lap	68	57½
9 to 12 in., lap	63	52½
Double Extra Strong, Plain Ends.		
½ in., butt	63	56½
¾ to 1½ in., butt	66	59½
2 to 2½ in., butt	68	61½
2 in., lap	64	57½
2½ to 4 in., lap	66	59½
4½ to 6 in., lap	65	58½
7 to 8 in., lap	58	47½

Subject to the usual variation in weight of 5 per cent.

The new lists on full pipe, black and galvanized, will be as follows:

Size.	List price per foot.	Diameters. External.	Internal.	Thickness.	Weight per foot. Plain ends.	Threads and couplings.	Threads per inch.
⅛	$.05½	.405	.269	.068	.244	.245	27
¼	.06	.540	.364	.088	.424	.425	18
⅜	.06	.675	.493	.091	.567	.568	18
½	.08½	.840	.622	.109	.850	.852	14
¾	.11½	1.050	.824	.113	1.130	1.134	14
1	.17	1.315	1.049	.133	1.678	1.684	11½
1¼	.23	1.660	1.380	.140	2.272	2.281	11½
1½	.27½	1.900	1.610	.145	2.717	2.731	11½
2	.37	2.375	2.067	.154	3.652	3.678	11½
2½	.58½	2.875	2.469	.203	5.793	5.819	8
3	.76½	3.500	3.068	.216	7.575	7.616	8
3½	.92	4.000	3.548	.226	9.109	9.202	8
4	1.09	4.500	4.026	.237	10.790	10.889	8
4½	1.27	5.000	4.506	.247	12.538	12.642	8
5	1.48	5.563	5.047	.258	14.617	14.810	8
6	1.92	6.625	6.065	.280	18.974	19.185	8
7	2.38	7.625	7.023	.301	23.544	23.769	8
8	2.50	8.625	8.071	.277	24.696	25.000	8
8	2.88	8.625	7.981	.322	28.554	28.809	8
9	3.45	9.625	8.941	.342	33.907	34.188	8
10	3.20	10.750	10.192	.279	31.201	32.000	8
10	3.50	10.750	10.136	.307	34.240	35.000	8
10	4.12	10.750	10.020	.365	40.483	41.132	8
11	4.63	11.750	11.000	.375	45.557	46.247	8
12	4.50	12.750	12.090	.330	43.773	45.000	8
12	5.07	12.750	12.000	.375	49.562	50.706	8
13	5.60	14.000	13.250	.375	54.568	55.824	8
14	6.10	15.000	14.250	.375	58.573	60.375	8
15	6.50	16.000	15.250	.375	62.579	64.500	8

The new lists on extra strong and double extra strong, black and galvanized, will be as follows:

Extra Strong.

Size.	List price per foot.	Diameters. External.	Internal.	Thickness.	Weight per foot, plain ends.
⅛	$ .12	.405	.215	.095	.314
¼	.07½	.540	.302	.119	.535
⅜	.07½	.675	.423	.126	.738
½	.11	.840	.546	.147	1.087
¾	.15	1.050	.742	.154	1.473
1	.22	1.315	.957	.179	2.171
1¼	.30	1.660	1.278	.191	2.996
1½	.36½	1.900	1.500	.200	3.631
2	.50½	2.375	1.939	.218	5.022
2½	.77	2.875	2.323	.276	7.661
3	1.03	3.500	2.900	.300	10.252
3½	1.25	4.000	3.364	.318	12.505
4	1.50	4.500	3.826	.337	14.983
4½	1.80	5.000	4.290	.355	17.611
5	2.08	5.563	4.813	.375	20.778
6	2.86	6.625	5.761	.432	28.573
7	3.81	7.625	6.625	.500	38.048
8	4.34	8.625	7.625	.500	43.388
9	4.90	9.625	8.625	.500	48.728
10	5.48	10.750	9.750	.500	54.735
11	6.10	11.750	10.750	.500	60.075
12	6.55	12.750	11.750	.500	65.415

The permissible variation in weight is 5 per cent. above and 5 per cent. below.

Double Extra Strong.

Size.	List price per foot.	Diameters. External.	Internal.	Thickness.	Weight per foot, plain ends.
½	$ .32	.840	.252	.294	1.714
¾	.35	1.050	.434	.308	2.440
1	.37	1.315	.599	.358	3.659
1¼	.52½	1.660	.896	.382	5.214
1½	.65	1.900	1.100	.400	6.408
2	.91	2.375	1.503	.436	9.029
2½	1.37	2.875	1.771	.552	13.695
3	1.86	3.500	2.300	.600	18.583
3½	2.30	4.000	2.728	.636	22.850
4	2.76	4.500	3.152	.674	27.541
4½	3.26	5.000	3.580	.710	32.530
5	3.86	5.563	4.063	.750	38.552
6	5.32	6.625	4.897	.864	53.160
7	6.35	7.625	5.875	.875	63.079
8	7.25	8.625	6.875	.875	72.424

The permissible variation in weight is 10 per cent. above and 10 per cent. below.

The following notes apply to both tables:

Furnished with plain ends and in random lengths, unless otherwise ordered.

All weights given in pounds. All dimensions given in inches.

Random length of extra strong and double extra strong pipe is considered to be 12 ft. to 22 ft., we to have the privilege, however, of supplying not exceeding 5 per cent. of total order in lengths from 6 ft. to 12 ft.

For pipe fitted with threads and couplings, an extra charge will be made above plain ends.

For cut lengths, an extra charge will be made above random.

For galvanized or coated pipe, an extra charge will be made above black.

The following table presents a comparison between the old and new price lists:

Comparison of List Prices and Weights of Black and Galvanized Merchant Steel Pipe from ⅛ In. to and Including 15 In. Under Classifications of January 1, 1910, and January 1, 1913.

Size.	List price per ft., old card.	List price per ft., new card.	Weight per ft., old card.	Weight per ft., new card.	Difference in list prices.	Difference in weight.
⅛	$ .05½	$ .05½	0.24	0.245	....	0.005
¼	.05½	.06	0.42	0.425	0.005	0.005
⅜	.05½	.06	0.56	0.568	0.005	0.008
½	.08½	.08½	0.84	0.852	....	0.012
¾	.11½	.11½	1.12	1.134	....	0.014
1	.16½	.17	1.67	1.684	0.005	0.014
1¼	.22½	.23	2.24	2.281	0.005	0.041
1½	.27	.27½	2.68	2.731	0.005	0.051
2	.36	.37	3.61	3.678	0.01	0.068
2½	.57½	.58½	5.74	5.819	0.01	0.079
3	.75½	.76½	7.54	7.616	0.01	0.076
3½	.95	.92	9.00	9.202	0.03*	0.202
4	1.08	1.09	10.66	10.889	0.01	0.229
4½	1.30	1.27	12.49	12.642	0.03*	0.152
5	1.45	1.48	14.50	14.810	0.03	0.310
6	1.88	1.92	18.76	19.185	0.04	0.425
7	2.35	2.38	23.27	23.769	0.03	0.499
8	2.50	2.50	25.00	25.000	....	.....
8	2.82	2.88	28.18	28.809	0.06	0.629
9	3.40	3.45	33.70	34.188	0.05	0.488
10	3.20	3.20	32.00	32.000	....	.....
10	3.50	3.50	35.00	35.000	....	.....
10	4.00	4.12	40.00	41.132	0.12	1.132
11	4.50	4.63	45.00	46.247	0.13	1.247
12	4.50	4.50	45.00	45.000	....	.....
12	4.90	5.07	49.00	50.706	0.17	1.706
13	5.75	5.60	56.10	55.824	0.15*	0.276*
14	6.50	6.10	60.70	60.375	0.40*	0.325*
15	7.00	6.50	64.90	64.500	0.50*	0.400*

*Decrease.

The National Tube Company states that galvanized pipe will in future weigh practically the same as black pipe. Skelp for galvanized pipe will be made a little lighter than for black pipe to allow for the weight of the spelter used in galvanizing, so that the finished galvanized pipe will cost no more per foot for freight than black pipe. The change in the discount on galvanized carloads from 1 point to 1½ points is so that the profit on such sales by jobbers will net them about the same percentage as on black pipe.

Best Mfg. Company's Large Piping Contracts

The Best Mfg. Company, Pittsburgh, Pa., has secured a contract from the Youngstown Sheet & Tube Company, Youngstown, Ohio, for the piping and valves for its new blast furnace, six open-hearth steel furnaces, blooming mill and condensers, turbines and boiler house, deliveries running over 8 to 10 months. The company has also booked contracts from the Indiana Steel Company, Gary, Ind., for a complete high pressure super-heat system for waste heat from 28 open-hearth furnaces to a like number of boilers; Republic Iron & Steel Company, Youngstown, Ohio, for piping for new construction work now in process; Arizona Copper Company, Clifton, Ariz., and Calumet & Arizona Mining Company, Douglass, Ariz., for all piping necessary for new smelters. It is now making shipments on the Pittsburgh Steel Company's contract for piping for the new work at Monessen, Pa., which includes two large blast furnaces.

The Best Company states that the requirements of these contracts illustrate the great advancement made in steam engineering in the past few years. The introduction of superheated steam for power has obliged the piping manufacturers to produce material to withstand severe service. Cast iron valves and fittings were formerly used but they must now be made of steel. It is also interesting to note the advances made in the construction of pipe products. Until quite recently pipe over 30 in. in diameter, if made in steel, had to be made of riveted sheets, whereas now lap-welded pipe can be procured up to 84 in. in diameter. The company has now in its shops 42-in. lap-welded pipe fitted with Vanstoned flanges, which it believes to be the first to be flanged in this manner. The piping materials required for the contracts with the Indiana Steel Company, Arizona Copper Company and Calumet & Arizona Mining Company, above referred to, include steel valves having Monel trimmings, steel fittings and steel flanges Vanstoned on pipe.

The Penn Steel Casting & Machine Company, Chester, Pa., has dismantled the Tropenas converter plant in its No. 2 foundry and installed in its place a five-ton acid open-hearth furnace. With this and other facilities, it states, it is now better equipped to produce small steel castings, of either carbon or special alloys, and will also be enabled to make prompt shipments.

Ontario Iron Ore Shipments Light in 1912

DULUTH, MINN., December 7.—Shipments of iron ore from the mines of the Lake Superior Corporation, whose works are at Sault Ste. Marie, Ont., have been smaller the past season than for some years, and have amounted to but 48,837 tons. This compares with 128,627 tons for the preceding season and with some 111,000 tons for the year 1910. The company's Algoma Central & Hudson Bay Railroad has been pushed northward this year and now reaches the mines of the Michipicoten range, where the company is developing new and operating old properties. It is also as far north as the crossing of the main line of the Canadian Pacific road, and is to be extended north to the Grand Trunk Pacific, which will bring it well up in the James Bay region, so that F. H. Clergue's dream of Hudson Bay fish deliverable in Chicago all rail in 24 hours from the sea is in a fair way to be accomplished before long. The company's rail mills at the Sault have been drawing most of their ores from the Lake Superior ranges in the States, but it is the hope that another year a far less proportion will come across, and that its new Magpie mine and the Moose Mountain property of Sellwood and Mackenzie & Mann will be able to supply a large share of the ore required. The mills are sold up for a long period and the outlook for their future is very bright. This year a calcining works has been under construction at the Magpie, which is a very large deposit of siderite, but this will not be in operation before next spring, though one of the three units may be ready in a month or two.

Moose Mountain iron ore shipments this year have been small, amounting to about 50,000 tons. The company's magnetic concentration works are about ready for operation, but are not to be started until next spring. It is the expectation of the operators that they will be able to make a briquetted concentrate running better than 60 per cent. iron for a cost of about $2 a ton. Of this the briquetting will be a very considerable share, and the mining charge is expected to be very low. A good deal of this ore is likely to go to the Sault.

The Cement Show at Pittsburgh.—The Cement Products Exhibition Company has opened offices in the Frick Building, Pittsburgh, to make arrangements for the Cement Show to be held in the Exposition Building in that city, December 12 to 18. Edward M. Hagar, president of the association, states that there will be over 250 exhibits and that they will be more diversified than ever before. The convention will be opened by William A. Magee, mayor of Pittsburgh. The cities of New York, Chicago, Boston and St. Louis will have representatives in the convention and a number of Government officials will also attend.

The Panama-Pacific International Exposition, San Francisco, Cal., will open bids on Machinery Hall about December 16. A circular giving information for exhibitors states that the display in this department is to demonstrate the latest development in prime movers, boilers, producers and auxiliary apparatus used in connection therewith, together with methods and apparatus for testing them. Separate groups are provided for machines and tools for making machinery, for working metals and wood, and for the various appliances employed in machine works and wood-working methods.

The steamer Percival Roberts, Jr., named for one of the directors of the United States Steel Corporation, which is being built at the Lorain yards of the American Shipbuilding Company for the Pittsburgh Steamship Company, was launched December 7. The new boat is 600 ft. long with 58 ft. beam and is constructed under the Isherwood system. It has an ore carrying capacity of 12,000 tons. The vessel is a sister ship of the steamer James A. Farrell which was recently launched in the same yard.

Holroyd & Co., manufacturers of taps, dies and screw plates, Troy, N. Y., have a new set of officers, owing to the retirement of George E. Holroyd from active business December 1. George McI. Holroyd is treasurer; W. E. Nichols is secretary and general manager; Charles D. Baughton is purchasing agent and general sales manager.

Trench's View of Steel and Copper

The Steel Trade in Sound Condition—Duel Between American Copper Producers and European Consumers

Under date of December 3, C. S. Trench & Co., 81 Fulton street, New York, have issued a market circular from which the following excerpts are taken:

If there were any doubts as to whether the remarkable trade movement that has been going on in Europe for over a year, and in this country for several months, was as real a thing as it appeared to be, those doubts have been dissipated by what has happened during the past two months. In the face of the most disturbing political developments in years, which might have easily shattered an ordinary sound business situation; with semi-panicky conditions on the European bourses; with the prospect of heavy reductions in our tariff duties, to affect adversely the American values of hundreds of commodities; with the highest money rates here and abroad since the panic of 1907, business abroad has shown very few signs of recession, while, with us, our trade activity has not only held its own but has actually now spread into lines that were lagging behind a month ago.

One is unable to explain and can only record the fact. Ordinary business experience supplies no explanation or key. . . . The test undergone has proved that the present business situation is the natural development of real fundamental conditions, a real physical condition caused by the real physical requirements of the world, not dependent on sentiment or speculative enthusiasm.

With us, our financial resources are being strained to move the largest crop on record and to finance our great business activity. This has made an extremely high rate for call money. But being caused by prosperity, and the reluctance of our bankers to draw gold from Europe, and not being from lack of confidence and the hoarding of funds as we have seen in former high money times, it is no cause for apprehension.

We regret to have to notice again, however, the strange feature that the failure records continue to show a large number of commercial failures with large total liabilities, a development which is in marked contrast with the other records in the business situation.

To sum up, while of course it is possible that the European situation may become more serious, that financial troubles may develop there, and that our business may react under such an additional serious check, still we feel there is every reason to take an optimistic view of the future and as we write the European situation seems to promise an early adjustment.

Iron and Steel

A month after the election it might be thought possible to gauge accurately the result upon the iron and steel market, but the showing is an uncertain one. Looking for symptoms we find the following points: 1. Finished steel prices are unchanged, but the long continued and somewhat rapid advance ended in the fore part of October, not at election time. 2. Pig iron advanced in November, but less than half as much as in October. 3. The pressure upon mills for deliveries against old contracts is, if anything, increased. 4. The volume of contract business in steel products in November was heavy, but on the other hand it was probably somewhat less than in October, and the flow underwent a sharp decrease toward the close of November.

If in the above showing it be thought that there are clear evidences that the election had a harmful effect upon the iron and steel market, two rejoinders may be made: 1. Steel prices have not advanced further, because the steel mills feel that it is simply ordinary business prudence to hold present prices, which are profitable and satisfactory. 2. As contract business has been done quite fully up to about next midsummer, it is not reasonable to expect business to go on and cover up the third quarter also.

One evidence that the election has not disturbed the course of the iron and steel market is found in the fact that on November 19 the Lake Superior ore interests announced ore prices for the season of 1913, advancing Bessemer ores (over the season just closed) 65c. and non-Bessemers 55c., to a level just 10c. below the 1911 schedule. This is substantially the programme forecasted long before the election and practically discounted in the trade.

Despite conditions as they appear from market movements, there is no disguising the fact that there has sprung up—not universally, perhaps, but undoubtedly in certain quarters—a feeling of uncertainty as to the second half of 1913. The feeling is probably simply this, that as to the next six or eight months the business was fixed and established, but, as regards beyond that time, the period for which plans are yet to be made, it is well to go slow.

Copper

As usual we have to begin our review of the month by referring to the Copper Producers' statistics. Those for October, shortly after our circular went to press, showed that the production of the refineries was now established on the basis of at least 140,000,000 lb. per month, as for the third month in succession the refinery output has exceeded this amount; America had taken 50 per cent. more copper in October than in January, and 3,500,000 lb. more than the heaviest deliveries on record, and yet, in spite of this, the producers' stocks showed an increase of 13,679,377 lb., caused by the exports falling to 47,621,342 lb., or the smallest exports since February, 1911.

No smaller rate of production is to be expected at present extremely profitable prices. The American deliveries which were at the rate of 990,265,440 lb. per annum in October as against 732,405,180 lb. last year, cannot be expected to be increased, and as a surplus of stocks results on the basis of our present exports, it becomes necessary therefore to examine the foreign situation.

We would be compelled to take a very pessimistic view of the maintenance of the 17¾c. market if we believed that the October-November exports approximately represent the demand for our copper from Europe, even granting the financial strength of our producers to hold price in face of their stocks increasing at the rate of say 15,000,000 lb. per month. The French and English statistics show that during the past year there has been an increase in consumption so large that the foreign stocks have decreased 15,660 tons in 11 months and now stand at 31,690 tons. Also, the bulk of this copper is now in the shape of grades that are useless to the consumer who cannot use it. This copper is suitable for speculative purposes but not for ordinary consumption until it has first been refined. These stocks cannot be much further reduced without causing a strained situation. When we turn to the Continent (it is true that Continental statistics show the stocks only in Hamburg and Rotterdam), we see the stocks stand at only 2560 tons, showing a decrease of 11,840 tons for the year. But there are no figures from which to judge the position of the supplies being carried in other parts of Germany and in the interior of Europe. One is dependent therefore on advices from those who are in a position to know, and these advices are unanimous that Europe is down to bare poles on copper, and that the consumers there are carrying no stock. They were the first to buy heavily at low prices, and they were the first to leave the copper market alone when the market advanced, although in doing so they are following their opinions rather than their order books. All advices show that European consumers of copper are heavily booked with orders for their manufactured goods running over a large portion of next year, and if these orders stick—in other words, if the political developments do not cause a smash-up in the foreign business situation—the consumption of copper in Europe next year will be at least equal to, if not greater than, the present, and our exports will have to show a large increase.

The situation at present is a duel between the American producers and the foreign consumers. During the past month the producers have had a little the better of the fight, as the necessities of the foreign consumers and the indication of a more settled political situation caused a buying movement, by which our producers were able to sell about 50,000,000 lb. of copper. This puts them in a strong independent position, and they can easily afford to look on. They must be prepared, however, for a hand-to-mouth demand. Neither European nor American consumers will carry full stocks at present prices.

To sum up, we see no immediate decline in prices, but for our producers to advance their prices would be foolhardy. Our consumers must buy soon for their January and February requirements, and they are in favor of a steady market while their business continues as good as it is, on account of its steadying effect on their contracts with their customers and general public confidence.

The Machinery Markets

An increased activity is noted in various of the principal machinery distributing centers and should inquiries recently issued be closed before January 1 the finish of 1912 will be a good one and materially help to swell already favorable yearly statements. In some directions there is a continuance of rather quiet conditions. New England leads in good news with the Boston & Maine Railroad list calling for $500,000 worth of shop equipment, while business generally in that section continues good. New York houses, while feeling a slackening up, have done fairly well and there are good prospects. November was fair in Philadelphia, but there has been a little falling off since the last week of that month. Despite a quietness in some lines business generally has been fair in Baltimore. Improvement is shown in Cleveland where after a lull of two weeks orders are coming along in fair volume with especially active buying by automobile makers. An advance of 5 per cent. has been made on metal working planers. While the railroads have been doing some quiet buying of shop equipment in Cincinnati no great improvement is expected there until after the holidays. Detroit has considerable miscellaneous inquiry though conditions tend to be quiet. Inquiries are increasing in St. Louis and there are other signs of improvement. Business is keeping up remarkably well in the Central South, although a slight slowing up is felt. Although inquiries are still good, sales of some products have diminished in Birmingham. The end of the year is bringing less activity to Texas, but the smaller demand is only temporary. Trade has been maintained remarkably well on the Pacific coast and sales are near normal, with some good inquiries from woodworking plants and canneries coming out.

New York

NEW YORK, December 11, 1912.

The last week brought increased activity to the New York market, especially in the matter of inquiries, several of which give promise of culminating in sales before the end of the year. The trade is working hard to make as good a showing as possible this month and finish the year with the best statement possible and the slackening tendency of the last few days has served to stimulate selling effort. In many cases yearly records have been broken already. As previously said, a handicap to sales is the disposition of buyers to hold up definite action until after January 1, and to overcome this attitude there have been cases where machine tools have been delivered this month with the understanding that they are not to be invoiced until after the first of the new year. While most machine tool houses feel a slackening up in demand they report that miscellaneous small sales are keeping up well for the season. The big list of equipment required for the new Billerica shops of the Boston & Maine Railroad has been received by New York representatives of the trade. The Bethlehem Steel Company, South Bethlehem, Pa., which has been making extensive additions to its producing equipment, is expected to make known before long some heavy machine tool requirements. It now has out an inquiry for four large turret lathes having a 7-in. spindle capacity for projectile work. The Taylor-Wharton Iron & Steel Company, High Bridge, N. J., has sold several carloads of large lathes, formerly used on projectile work, to a California machinery company and has placed renewal orders. Another recent purchaser has been the Hartford Suspension Company, Jersey City, N. J., which has closed for equipment to be used in the manufacture of its new electric automobile starter for which a great demand is anticipated. The company will very shortly move a part of its plant into a new eight-story building, the second of its kind to be occupied within a year. The Reading Standard Company, Reading, Pa., maker of bicycles and motorcycles, has a small list of machine tools before the trade. The Autocar Company, Ardmore, Pa., is understood to be contemplating an increase in its plant facilities, but no definite decision has been reached. The pneumatic tool business has been good and growing better for many months, with a consequent increase in manufacturing equipment.

The Suffolk Light, Heat & Power Company, Southampton, N. Y., W. M. Hambright, general manager, is completing arrangements for adding to its power plant a new boiler and engine and two transformers.

The Nestle Food Company, Inc., Fulton, N. Y., has been incorporated with a capital stock of $250,000 to manufacture food products, and will estabish a plant for the purpose. T. Leeming and D. E. Austin, New York City, and L. W. Brougham, Brooklyn, are the directors.

The Water Commissioners of Sodus, N. Y., are receiving bids until December 27 for water supply and pumping equipment for the waterworks system, which will include a storage reservoir, a pumping plant and six miles of four, six and eight-inch cast iron pipe.

The Wayland-Steuben Power Company, John Kimmel president, Wayland, N. Y., will establish an electric power plant. Arrangements are being made for the purchase of the required machinery and equipment.

The Cheney Hammer Company, Little Falls, N. Y., is having plans prepared for a three-story and basement factory building of brick and concrete construction, which it will erect and equip at once.

The New Process Gear Corporation, Syracuse, N. Y., has been incorporated with an authorized capital stock of $1,000,000, to manufacture gears, pinions, machinery, etc. A. T. Vossburgh and T. G. Meachen, Syracuse, and T. E. Meachen, Onondaga Valley, N. Y., are the incorporators.

Truitt Bros., Inc., Binghamton, N. Y., have had plans prepared for a shoe factory 60 x 100 ft., one-story and basement, which they will build at once.

E. L. Bailey, president the Dundee Electric Light Company, Dundee, N. Y., has plans in preparation for the building of a pumping station for the village waterworks for which an 8 x 10-in. triplex pump will be required.

The Board of Public Works, Oneida, N. Y., has had plans prepared for a sewage disposal plant to be erected by the city.

The village of Arcade, N. Y., at a special election held November 27, voted to purchase an additional unit comprising boiler and dynamo for its electric light plant. The clerk of the Village Board will receive bids.

The Ontario Knife Company, Franklinville, N. Y., has plans in preparation for the erection and equipment of a power plant to cost $25,000. The company now obtains from a local company.

The Armour Leather Company of Chicago has purchased the plant of the James Pierce Leather Company at Olean, N. Y. It is having plans prepared for the reconstruction and equipment of the buildings for the tanning of hides. The estimated cost of the improvements is about $150,000.

The Hodgman Rubber Company, Tuckahoe, N. Y., has plans in preparation for a three-story factory upon which construction work will soon be started.

The superintendent of public works for the State of New York, D. W. Peck, Albany, is receiving sealed proposals until December 31, for power plants, electrical machinery and equipment for operating and lighting locks and guard gates on the Erie canal and Champlain canal, covered by Barge Canal contracts Nos. 92 and 94.

The Littlefield-Clark Company, 21 Illinois street, Buffalo, N. Y., has been appointed sales agent for the territory of Weston, N. Y., for the Asbestos Protected Metal Company of Beaver Falls, Pa., manufacturer of asbestos protected roofing and siding, especially adapted for foundry, machine shop and factory buildings, as it is rust and acid proof.

James Stewart & Co., Chicago, have received general contract for construction of a 2,000,000 bu. grain elevator at Ganson street, City Ship Canal and Buffalo Creek Terminal Railroad, Buffalo, for the Washburn Crosby Company. The elevator will contain 25 reinforced concrete bins, each 25 ft. in diameter x 107 ft. in hight, with working house and operating equipment.

The North Buffalo Hardware Foundry Company, North Buffalo, N. Y., has increased its capital stock and will make some additions to its plant equipment at Hertel avenue and Bridgeman street.

The Linde Air Products Company, Buffalo, N. Y., manufacturer of oxygen and oxy-acetylene apparatus, is adding a large machine shop to its plant at Chandler and Manton streets. Considerable machinery equipment will be required.

The Niagara, Lockport & Ontario Power Company, Fidelity Building, Buffalo, will soon make purchase of supplemental auxiliary equipment for a 10,000 kw. steam turbine plant, which will include a coal and ash handling system.

The Buffalo Top & Trimming Company, Buffalo, manufacturer of automobile bodies, tops and accessories will remove its plant from 108 The Terrace to 121-123 West Chippewa street, where it is fitting up a new factory.

The Fidelity Rope Splicer Company, Buffalo, has been incorporated with $10,000 capital stock to manufacture couplings and special devices. Thomas J. MacFarlane, John B. Van Hook and Joseph W. Salhanick are the directors.

New England

BOSTON, MASS., December 10, 1912.

The long expected list of machinery for the new Billerica shops of the Boston & Maine Railroad was received by the dealers Saturday. It is the greatest list ever issued in New England, totaling close to if not quite $500,000. It is printed in full below. Naturally this is the subject of greatest interest in the trade. In general business with the dealers is maintaining the level of recent weeks.

The Boston & Maine List

The Boston and Maine list calls for deliveries in time to permit of the beginning of business at the shops on June 30, 1913. The details of the requirements follow:

One 14-in. x 6-ft. tool room lathe.
Three 18-in. x 8-ft. engine lathes.
One 18-in. x 6-ft. engine lathe.
One 18-in. x 8-ft. tool room lathe.
Nine 18-in. x 8-ft. engine lathes.
One 20-in. x 12-ft. engine lathe.
One 20-in. x 10-ft. engine lathe.
One 20-in. x 8-ft. engine lathe.
One 24-in. x 14-ft. engine lathe.
Three 24-in. x 10-ft. engine lathes.
Two 26-in. x 12-ft. engine lathes.
Two 26-in. x 10-ft. engine lathes.
One 36-in. x 12-ft. engine lathe.
One 42-in. x 16-ft. engine lathe.
One 48-in. x 20-ft. engine lathe.
One 6-in. bar turret lathe.
Two 3 x 36-in. flat turret lathes.
Three 2 x 24-in. flat turret lathes.
One 20-in. x 7-ft. cabinet brass turret lathe.
Four 18-in. brass turret lathes.
One heavy double driving axle lathe, 9 ft. between centers.
Three double car and tender axle lathes.
Two 14-in. x 5-ft. motor driven portable bolt lathes.
Two 90-in. heavy driving wheel lathes.
42-in., 51-in. and 72-in. double head boring mills.
One 84-in. double head boring mill with slotting attachments.
Two 30-in. turret boring mills.
Three 36-in. rapid production vertical swivel turret lathes.
One 42-in. rapid production vertical swivel turret lathes.
One motor driven locomotive cylinder boring machine.
One horizontal boring and drilling machine.
One double end rod boring machine.
Two 42-in. car wheel boring machines.
One 44-in. high duty drilling machine, with boring bar and tapping attachment.
Four 42-in. drilling machines, two with tapping attachments.
Three 40-in., two 38-in., four 32-in., four 25-in. and two 20-in. standard drilling machines.
Two 12-in. belt driven friction drilling machines.
Five 14-in. sensitive drilling machines.
One 4-spindle staybolt drilling machine.
Two 4-ft. and three 6-ft. plain radial drilling machines.
Three 5-ft. plain radial drilling machines, one with tapping attachment.
One 5-ft. and one 6-ft. full universal radial drilling machines.
One 72 x 72-in. x 30-ft. heavy duty planing machine, two cross-heads and one side head.
Two 54 x 54-in. x 10-ft. heavy duty planing machines, two cross-heads and one side head.
One 42 x 42-in. x 12-ft. heavy duty planing machine, with two cross-heads.
Five 36 x 36-in. heavy duty planing machines, with two cross-heads.
Three 30 x 30-in. x 10-ft. heavy duty planing machines, with two cross-heads.
Six 24 x 24 x 24-in. crank planing machines.
One 9-in., one 14-in. and one 20-in. pillar shapers.
Two 24-in. crank shapers.
One 16-in. single head traverse shaper.
One 22-in. double head traverse shaper.
One 32-in. Morton draw-stroke special railroad shaper.
Two 12-in. and one 15-in. slotting machines.
One 18-in. and one 20-in. traveling head slotting machines.
Two 30-in. x 10-ft. planer type milling machines.
One 48-in. extra heavy rod milling machine.
One 42-in. and one 33-in. heavy vertical milling machine.
One vertical milling machine, 18 x 49-in. elevation platen.
One 24 x 7 x 19-in. plain milling machine.
One 14 x 12-in. heavy plain milling machine.
Two 30 x 10 x 19-in. universal milling machine with full tool room equipment.
One 600-ton, 90-in. hydraulic press.
Two 400-ton, 44-in. car wheel hydraulic press.
One 50-ton and one 30-ton hydraulic power presses.
One 1½-in. double head staybolt cutter.
One 1¼-in. triple bolt cutter.
Two 1½-in. double bolt cutter.
One 2½-in. single head bolt cutter.
Three ⅝ x 7-in. two spindle centering machine.
One 2-in. bolt pointing machine.
One 1½-in. 4-head bolt turning machine.
One 12 x 12-in. x 12-ft. vertical grinding planing machine.
One 8 x 30 x 26-in. gap grinding machine.
One link grinding machine.
Two universal tool grinding machines.
Three twist drill grinding machines.
One cutter and reamer grinding machine.
One milling machine cutter grinding machine.
One cutting off and grinding machine for high speed steels.
One single spindle 5-wheel knife grinding machine.
One 26-in. automatic planer knife grinding machine.
One automatic circular saw grinding machine.
One 24 x 2-in. grinding and buffing machine.
Four 24 x 3-in. single wheel wet tool grinding machines.
One swing grinding machine.
One ¼ to 3-in., two 1 to 4-in. and one 4 to 14-in. pipe cutting and threading machines.
Two Pedrick & Smith 3-in. pipe bending machines.
One 4-in. and one 12-in. cold saw cutting-off machines.
Bending rolls, one for 1-in. plate 15 ft. long, one for ½-in. plate 8 ft. long.
One hand power bending rolls.
One plate straightening rolls.
One rotary splitting shear for ¾-in. plate.
One rotary bevel shear for 1-in. plate.
Plate shears, one for 1-in. steel plate, one for ½-in. steel plate.
Four bar iron shears.
Vertical solid frame punches, one to punch 1¼-in. holes in 1-in. plate, one to punch ¾-in. holes in ½-in. plate.
One double punch and shear, capacity 1½-in. hole in 1¼-in. plate.
Two double punch and shear, capacity 2½-in. hole in 1½-in. plate.
One horizontal flange punch, to punch 1½-in. holes through 1¼-in. plate.
One overhead framework type flue cleaner.
One Hartz flue welder.
One flue swaging machine.
One flue cutting machine.
One hydro-pneumatic flue tester.
One automatic safe end cutting off machine.
One 1200-lb., three 1500-lb., one 2000-lb., one 2500-lb. single frame steam hammer.
One 4500-lb. double frame steam hammer.
One 100-lb., four 300-lb. and one 1000-lb. belt driven hammers.
Two 5-in. and one 2-in. upsetting and forging machines.
Two 3-in. and one 1½-in. heading, upsetting and forging machines.
One 1½-in. eye-bolt bender.
One 30-in. hot saw and burring machine.
Two No. 9 bulldozers.
Twenty-five Ferguson oil furnaces.
Twenty coal forges.
One pneumatic staybolt nipper.
One portable pneumatic tank riveter.
One portable staybolt breaker.
One portable pipe bender.
One 150-ton hydraulic combination shear and riveter.
One power hack saw.
One squaring shears.
One Regent No. 2 hand punch.
One hand punch, 10-in. throat.
Six Franklin portable hoists, two tons capacity.
One Thermit welding outfit.
One Oxy-acetylene welding outfit.
One portable pneumatic flanging clamp.
Three Harrington Mills valve setting machines.
Two heavy type portable valve seat rotary planing machines.
One valve post milling machine.
One locomotive cylinder facing machine.
Two portable special locomotive boring bars, air motors.
Two portable special valve chamber boring bars, air motors.

Woodworking Tools

One 4-side sill planing machine.
One 6-roll fast feed planing and matching machine.
Two 12-in. inside 4-side moulders.
Two 36-in. heavy cut-off saws.
Seven circular saw tables.
One power feed edging saw.
One hand feed edging saw.
One heavy swing and one light swing cut-off saw.
One self-contained scroll saw.
Two 36-in. band saws.
Two automatic vertical car sill and tenoning machines.
One extra range heavy automatic car sill gainer.
One large car tenoner and gainer.
One pedestal tenoning machine.
Three standard heavy pattern 4-spindle vertical car boring machines.
One single spindle universal horizontal boring machine.
One vertical hollow chisel mortiser.
One 2-in. horizontal single spindle hollow chisel mortiser.
One 24-in. endless bed single surfacer.
One 24-in. single cabinet surfacing machine.
One single head hand feed paneling machine.
One double spindle wood shaping machine.
One 3½-in. stroke vertical mortising and boring machine.
One chain saw mortising machine.
One 26-in. x 12-ft. pattern maker's lathe.
One Cowdry dowelling machine.
One single motion sash clamp.
One 42-in. triple drum sanding machines.
One extra heavy dimension planing machine, 25-ft. bed.
One 16-in. heavy pattern jointer or buzz planer, 7-ft. table.

The Hjorth Lathe & Tool Company, 27 School street, Boston, has been organized with Hendrick J. Hjorth as president and Theodore Von Rosenvinge as treasurer, and has taken over the shops of the Remington Tool & Machine Company at Woburn, Mass. The company will manufacture bench lathes and their attachments, together with other inventions in the way of machinery and machinists' tools, the inventions of Mr. Hjorth, who was the mechanical engineer of the Remington Company and the inventor of its product. In addition to bench lathes the line will include screw cutting dies, spring winders, micrometer surface gauges and other devices and machines.

The machine tool people of New England are taking a strong interest in the tariff question as it may affect their product. In this connection it is of interest to note that the new Congressman from the Worcester district is Col. Samuel E. Winslow, head of the Samuel Winslow Skate Mfg. Company, who was elected on the Republican ticket, defeating the Democratic incumbent, who voted to place machine tools on the free list when the last tariff bill was before Congress.

The Standard Nut & Bolt Company, Valley Falls, R. I., is building an addition to its plant, 80 x 80 ft., one story, which will double the size of the plant. New machinery will be installed, duplicating the present equipment for the manufacture of hot forged bolts and cold punched nuts and iron work of various descriptions. The company was forced to make these extensions because of the increasing volume of business which had grown beyond the present capacity.

The Waterville Corporation, Waterbury, Conn., will erect a two-story factory, 60 x 160 ft., of brick, with steel beams and girders, and concrete roof.

Baltimore

BALTIMORE, MD., December 10, 1912.

In the machinery and tool lines business in November is reported by the majority of merchants to have been extremely light and confined largely to single tool purchases. The disposition of buyers is apparently to hold off until after the turn of the year. A number of fair equipment inquiries are before the trade, but are not expected to develop into definite orders in the immediate future. The railroads have bought very sparingly, purchases being confined to single tools. In special machinery the demand continues good and local builders have booked a fair volume of local as well as export orders. The demand for contractors' tools and equipment decreases as the time for restricted outdoor work approaches. Small tools and machine shop supplies continue in fair demand. A moderate trade in power equipment is passing, boilers of moderate capacity being in better inquiry than engines. Local fabricators of iron and steel work continue to receive a fair amount of orders, the bulk of which is confined to propositions involving from 15 to 75 tons. Considerable business of this class has come out in the South. The foundry trade is comparatively well engaged. On the whole business conditions are fair, and it is the consensus of opinion that the quietness exhibited in some lines is but temporary and that a material increase in activity will develop with the new year.

The Centreville Electric Light & Power Company, Centreville, Md., is receiving bids for the construction and equipment of an electric light and power plant.

The Cedar Chest Company, in which the Lane Brothers Company, Monto Alto, Va., is interested, is asking for bids on equipment for a new plant.

The J. Boyle Company, Wolfe and Thames streets, has placed a contract with J. J. Moylan for the erection of a three-story factory building at 811-819 South Wolfe street, which will be used for warehouse purposes. The building will be of brick, 81 x 115 ft., fireproof and equipped with elevators. Steam heat will be installed.

The Black-Decker Mfg. Company, builder of special machinery, is building a large addition to its machine shop and warehouse on South Charles street. It is expected to be ready for occupancy in about four months. An addition to the power plant is being considered. Considerable general machinery will be required for the new shop, although the purchase will not be taken up for several months.

The Baltimore Umbrella Company has acquired a five-story warehouse 20 x 100 ft. at 20 South Howard street, which is being altered to suit the purpose of umbrella making. Power equipment will be installed and later additional special and general machinery equipment.

The Maryland Fire Brick Company is about to let the contract for the general manufacturing department of its new plant at Harwood, Md., involving a series of three buildings 100 x 100 ft. each. The contract for the power house has not yet been placed, owing to the indecision as to the use of electric power or the installation of gas or oil engines. The contract for the general machinery equipment has been largely placed.

Detrick Bros., structural iron fabricators, are in the market for a second hand, three motor electric traveling crane of 20 to 35 tons capacity and 25 to 40 ft. span, to be used for loading purposes. They have received numerous contracts for fabricated steel work ranging from 15 to 75 tons. A good share of the business comes from the South. The shop is running on full time.

The Hancock Foundry & Machine Company, Hagerstown, Md., which was recently incorporated, has, it is stated in the Hagerstown Herald, been organized by the election of W. H. Dodson, president; F. Wilbur Bridges, vice-president, and H. N. Rosen, secretary-treasurer.

The F. E. Schneider Paving Company has awarded contract to Lauer & Harper for the erection of a one-story structural steel frame building, 30 x 35 ft., as an addition to its plant at Laurens and Monroe streets.

The Flynn & Embrich Company, iron founder and machinist, Saratoga and Holliday streets, has removed its office from 407 East Saratoga street, to 305 North Holliday street. The company has awarded the contract for the addition to its foundry to Armstrong & Parker, contractors. In the near future it will be in the market for additional minor equipment for the new addition.

The Baltimore Metal Ware Company has been incorporated with a capital stock of $200,000 to manufacture metal ware. Bruner R. Anderson, Law Building, Charles F. Pfatzgraf and Oscar E. Smith are identified with the new organization.

The Tyler Can Company will, it is stated, shortly begin work on the erection of a large addition to its plant at 1409 Eastern avenue. Plans for the building are now being prepared, although detailed information is not yet available.

The American Can Company, manufacturer of cans, has announced its intention to erect a manufacturing plant covering a ground space 176 x 258 ft. on Hudson street from Luzerne street to Montford avenue. The structure is to be of concrete, four stories, erected on concrete piles, which work will be done by the Raymond Concrete Pile Company.

Philadelphia

PHILADELPHIA, PA., December 10, 1912.

Business in machinery and tools in November is reported to have been comparatively good. A slackening in demand was shown in the closing week and so far this month the same apathy is to be noted. Manufacturers and merchants have closed but a light volume of new business, confined, as a rule, to single tool propositions. Inquiries have also been less numerous. Plant operations continue on a good basis. No fresh inquiries have been put out by the railroads, and orders from that source are scarce. The second-hand machinery market has been spotty. Little business of importance has developed in power equipment; the demand for boilers, however, continues better than that for engines. Both steel and gray iron castings have been in fair inquiry and foundry plants are well engaged.

Edward G. Budd Mfg. Company is having plans prepared by Rankin, Kellogg & Crane, architects and engineers, for a three-story factory building, 75 x 500 ft., to be erected at Tioga and C streets. The Budd company manufactures steel automobile bodies and general pressed steel work for the construction of which the new building will be used.

Charles Oelschlager, architect, has invited estimates on plans for a four-story manufacturing building, 39 x 93 ft., to be built at the corner of Twelfth and Winter streets. The name of the party for whom the building is to be erected has not been disclosed.

It is currently reported that S. S. Eveland, who was formerly connected with the Standard Roller Bearing Company, is organizing a company for the manufacture of electrical appliances to be used in connection with automobiles, and that a manufacturing plant will be leased in the vicinity of Twenty-third and Market streets.

A newspaper dispatch states that the plant of the Nazareth Foundry & Machine Company was damaged by fire to the extent of $10,000, December 1.

It is announced that George H. Bonner & Co., 13 South Thirteenth street, Philadelphia, have leased the plant formerly occupied by the Jacobson Engine Company, Front and Jeffrey streets, Chester, Pa. It is understood that necessary machinery will be installed for the refining of camphor.

Detroit

DETROIT, MICH., December 10, 1912.

A steady demand with moderate sales of from one to four tools and considerable miscellaneous inquiry is the report from local machinery dealers. There seems to be no trend toward curtailment of orders but the lull is considered only seasonable and the demand is expected to strengthen with the beginning of the new year. A considerable amount of business is in prospect from new companies in the automobile accessory line and this industry is looking forward to a banner season. The automobile companies are also active and a number of plants have extensions under way or projected. A fair movement in second-hand machinery is reported. Foundries continue well engaged with no sign of a slackening of activity. A surprising amount of new work has come out in building circles and operations will be actively pushed during the continuance of favorable weather.

The Studebaker Corporation, Detroit, has awarded contracts for the erection of a one-story brick forge building, 64 x 100 ft., at its Clark avenue plant, to cost $27,000, and for a three-story manufacturing building, 53 x 115 ft., at its Franklin street plant, to cost $20,000. The Coddington Engineering Company, Milwaukee, has the contract.

The Superior Motor Company, Detroit, has been incorporated with a capital stock of $100,000 by Henry Fraser, Walter C. Schneider and Gaylord C. Brimmer. The company proposes to manufacture gasoline engines of a new design.

It is announced that in addition to the extensions previously mentioned, the Morgan & Wright Company, the Detroit branch of the United States Tire Company, will erect a number of other new buildings, doubling the capacity. The contemplated additions include a six-story manufacturing building, 60 x 230 ft., a new power building, a laboratory building and warehouses.

The Detroit Autoheater Company, Detroit, has been incorporated with $3,000 capital stock to manufacture automobile heaters and other accessories. Oswald Zahn is at the head of the new company.

The Michigan Sprocket Chain Company, Detroit, has filed notice of an increase of capital stock from $50,000 to $100,000.

The Detroit Mfg. Company, Detroit, has been incorporated with $5,000 capital stock to manufacture metal baskets and electric welders. The incorporators are James Hamilton, Frank Mahoney and Arthur Schueler.

The Kliesner-Klenner-Enz Company, Detroit, has been incorporated with $7,000 capital stock to manufacture trunks and leather goods. Gerhard Dickhoff is at the head of the new company.

The Sorenson-Frank Nut Company, Detroit, has engaged in business to manufacture and deal in nuts, burs and metal goods, with an authorized capital stock of $50,000. S. Walter Sorenson, William F. Frank and George F. Frank are the incorporators.

In addition to the new buildings now being completed, the Chalmers Motor Company, Detroit, will add a third extension, 150 x 160 ft., to its plant.

The Cragg Motor Mfg. Company, Detroit, has been organized with $4,000 capital stock to manufacture motors and accessories. Edward F. Alleman is among those interested.

The Murchey Machine & Tool Company, Detroit, has been incorporated under the same style with $40,000 capital stock. Walter H. Jennings is the principal stockholder.

The Toledo Computing Scales Company has completed plans for the erection of a new factory building in Windsor, across the river from Detroit. The building will be four stories, 70 x 260 ft., and will cost about $80,000.

The Wayne Soap Company, Detroit, has increased its capital stock from $25,000 to $75,000.

The Flanders Mfg. Company and the Flanders Motor Cycle Company, Pontiac, Mich., have been adjudicated bankrupt upon the petition of creditors, and the Detroit Trust Company has been named as receiver. The companies are stated to be solvent but have consented to the appointment of a receiver for special reasons.

The Bad Axe Brick & Tile Mfg. Company, Bad Axe, Mich., has been incorporated with $6,000 capital stock to operate a brick plant.

The Schaible-Weideman Auto Company, Ypsilanti, Mich., is erecting a garage, 46 x 156 ft., in which a small repair shop will be installed.

J. C. Kirkpatrick, Escanaba, Mich., is at the head of a new company which is being organized with $75,000 capital stock to manufacture veneering. A plant is being arranged for at Escanaba.

Cleveland

CLEVELAND, OHIO, December 10, 1912.

The demand for machine tools is again fairly active after a dull spell lasting for two or three weeks. In the past few days the market has improved materially. Orders for small single tools have been quite plentiful and some orders were taken in lots of two or three tools. One machinery house booked orders aggregating $20,000 exclusive of some scattered small tool orders. Among these were three boring mills sold to Akron rubber manufacturers. Business is quite scattered, although the demand is most active from automobile manufacturers and allied industries. Considerable new business is in prospect and will probably come out early in the year. One Ohio manufacturer is figuring on the purchase of 30 machines for plant extensions, the formal inquiry for which is expected shortly. Another good sized list is looked for soon from a manufacturing concern. A 5 per cent. advance on planers has been made and advances on other lines of machine tools are looked for. The demand for handling equipment and general machinery, including mining machinery and hydraulic power plants, continues active. In the foundry trade there is no falling off in the heavy demand.

The Victor Brass Mfg. Company, Cleveland, Ohio, recently incorporated with a capital stock of $25,000, has leased the building at 6813 Wade Park avenue, recently occupied by the Commercial Dairy Machinery Company, and is fitting it up for the manufacture of plumbers' brass goods. Most of the equipment has already been purchased, but the company is in the market for some of the smaller supplies needed. J. H. Lyons, L. J. Brennan and N. J. McGrath are interested in the company. Officers have not yet been elected.

With a view of extending its business, the Standard Pump & Engine Company, Cleveland, Ohio, maker of pumps for water supply systems, has increased its capital stock from $25,000 to $100,000.

The Ohio Malleable Iron Company, Columbus, Ohio, is in the market for immediate delivery for 500 shop boxes, size approximately 21 x 15 x 6 in., tapered to nest, No. 16 gauge.

The Jennison & Wright Creosoting Company, Toledo, Ohio, will erect a new building to double the capacity of its plant. Considerable new equipment will be added, including machinery and cars.

The Superior Foundry Company, Cleveland, has just started work on additions to its plant, plans for which were announced several weeks ago. These will include an extension to the foundry, 90 x 350 ft., and a pattern storage building, 50 x 130 ft.

The Ashland Foundry Company, Ashland, Ohio, has about completed a new up-to-date foundry to take the place of one that was burned a year or more ago. The business will be conducted by Robert McIntosh and Ralph Herbert.

The Sixth City Machine Company, Cleveland, has been incorporated with a capital stock of $10,000 by Ray C. Skeel, Charles L. Ringle and others.

W. F. Collins, maker of machinery, dies and tools, has just completed a new plant adjoining his present quarters at 2091 East Nineteenth street.

The Toledo Glass Company, Toledo, Ohio, has commenced the erection of a large plant, which will include a main building, 100 x 460 ft., of brick and steel construction. A gas generating plant will also be built.

The Sandusky Automobile Parts Company, Sandusky, Ohio, maker of auto trucks and accessories, is planning the enlargement of its plant.

The O'Neill Machine Company, Toledo, Ohio, has been incorporated with a capital stock of $10,000 by Frank O'Neill, William R. Graham and others.

Plans for a sewage disposal plant for Vermillion, Ohio, have been completed. The estimated cost of the plant is $38,000.

Henry Neufer, Norwalk, Ohio, has been given a contract to supply the village of Milan with electricity for lighting purposes and will erect a plant in that place.

Indianapolis

INDIANAPOLIS, IND., December 10, 1912.

Plans for a new forge plant for the Link-Belt Company, Holmes avenue, Indianapolis, have been submitted to the building inspector. The building will be 48 x 158 ft., of one-story brick and steel, and will cost $14,000.

The Indianapolis & Cincinnati Light & Power Company, Indianapolis, has been incorporated as auxiliary to the Indianapolis & Cincinnati Traction Company, for the purpose of supplying light, heat and power to cities and towns along the traction line. The directors of the company include Winfield T. Durbin and Charles L. Henry, of Anderson; George A. Ball, Muncie, and John F. Wild and John J. Appel, Indianapolis.

The M. A. Hofft Company, Indianapolis, has been incorporated with $10,000 capital stock, to manufacture filtration systems. The directors are M. A. Hofft, O. E. Ellis and E. V. Knight.

The Ohio & Indiana Stone Company, Indianapolis, has increased its capital stock $100,000.

The Auto Lamp & Number Company, Indianapolis, has been incorporated to manufacture automobile accessories. The directors are Ransom Griffin, A. P. Conklin, R. H. Bruce, William F. Johnson and George L. Maas.

The New-Miller Carburetor Company, Indianapolis, has been incorporated with $200,000 capital stock, to manufacture carburetors and other automobile accessories, gas and gasoline motors, etc.

The Princeton Water Company, Princeton, Ind., will put in a filtration plant.

The Evansville Carriage Wood-Stock Company, Evansville, Ind., has been incorporated with $20,000 capital stock, to manufacture wood parts for vehicles. The directors are Guild C. Foster, Charles Hambly and Charles W. Wittenbraker.

The Hercules Buggy Company, Evansville, Ind., has increased its capital stock from $1,000,000 to $1,250,000.

The Ft. Wayne Iron Store Company, Ft. Wayne, Ind., has increased its capital stock $65,000.

William M. Crockett has been appointed receiver for the Lafayette Safe & Lock Works, Lafayette, Ind., on application of the secretary, John J. Schultz.

The Warsaw Cut Glass Company, Warsaw, Ind., has been incorporated with $50,000 capital stock, to manufacture cut glass. The directors are A. T. Johnson, Carl A. and Oscar A. Hugo.

Herbert Deprez has been appointed receiver for the Frechtling & Merner Bentwood Works, Shelbyville, in order to settle up the estate, following the death of the senior partner.

The O'Dell Mfg. Company, Los Angeles, Cal., has bought a site in Marion, Ind., for a plant for a razor factory.

Cincinnati

CINCINNATI, OHIO, December 10, 1912.

Machine tool builders who have taken the trouble to go over their records for the present year state that business will make a showing of about 60 to 80 per cent. better than last year. Orders are coming in slowly at the moment, however, and little improvement can be expected until after the holiday season passes. While the railroads have quietly bought a large number of tools, the demand from that source has not been up to expectations, and there are numerous lists on file that are yet to be purchased on.

The coke shortage has embarrassed a few of the jobbing foundries, but so far no serious delays have occurred on this account. Second-hand machinery is moving slowly.

The Joseph Joseph & Brothers Company, Cincinnati, scrap iron market, has tentative plans under way for a large addition to its plant on Harrison avenue. Work on the new addition will not begin until next spring, and nothing is yet known as to the company's machinery requirements.

The Cincinnati Brewing Company, Hamilton, Ohio, is receiving estimates on a 150-ton refrigerating plant, and included in the equipment needed is a power plant with accessories.

The Cataract Rubber Company, Wooster, Ohio, has made arrangements to electrify its plant and will require a number of small motors.

The Regle Brass Foundry, Marysville, Ohio, has nearly completed its new plant, recently mentioned, and will be ready to install the necessary machinery within the next 30 days.

The Advance Millwork Company, Covington, Ky., will soon let contract for a foundry addition, for which some special equipment will be required.

The Charles W. Breneman Company, Cincinnati manufacturer of window shades and other specialties, will soon make an extensive addition to its factory on Reading road. The list of machinery equipment has not yet been made up.

The Northway Motor Company, Cincinnati, is a new incorporation, with $600,000 capital stock, to take over the plant of the Ohio Motor Car Company, in Carthage, a Cincinnati suburb. It is rumored that extensive improvements are contemplated. R. E. Northway, Hartwell, Ohio, is the principal incorporator of the new company.

The New Concord Water & Electric Company, New Concord, Ohio, has been incorporated with $20,000 capital stock, and will probably build an electric lighting plant. H. M. Shaw and A. R. Johnson are interested in the new company.

The Von Wyck Machine Tool Company, Cincinnati, has been incorporated with $20,000 capital stock, to take over the plant now operated under that name. The incorporators are Philip Fosdick, C. B. Kern and J. H. Clermont, and as was recently mentioned, it is the plan of the new management to add to the plant's manufacturing facilities at an early date.

The Davis Sewing Machine Company, Dayton, Ohio, has tentative plans under way for a large addition to its motorcycle plant, for which a considerable number of machine tools will be required later on.

The C. W. Raymond Company, Dayton, Ohio, has obtained contract from the Ontario National Brick Company, Toronto, Ont., for machinery to be installed in what will be one of the largest brick plants in the world.

It is announced that the Ohio Tool Company, Columbus, Ohio, will soon move its plant to Charleston, W. Va., and will add materially to its manufacturing facilities.

The Central South

LOUISVILLE, KY., December 10, 1912.

Business for December is moving along in a manner befitting the closing month of a remarkable year. While some houses report the usual slackening up of orders due to inventory taking and the approach of the holiday season, others, especially those dealing in machine tools and general machinery lines, say that orders are just as plentiful as ever, and that the business thermometer is continuing its steady upward trend, rather than remaining stationary or falling. There is no abatement of the export demand for electrically-driven machine tools, and the market for electrical equipment generally is very active.

The James Clark, Jr., Electric Company, Louisville, reports several recent orders from England for electric machine tools, London, Southampton and Liverpool being among the points of consignment. The same company has also contracted to supply to the Gate City Light, Heat & Power Company, Gate City, Va., a 50 kw. 2300-volt alternator, for alternating current, and has sold to the Eureka Cotton Mills, Englewood, Tenn., a 50 kw. direct current alternator, 2300 volts, 60-cycle.

The Oertel Brewing Company, Louisville, will add to its brewery plant a bottling department, to be housed in a concrete and steel building, 40 x 100 ft., with two stories and basement. Power and bottling machinery will be required.

The Kentucky Metal Products Company, Louisville, has filed articles of incorporation through Garner E. Dalton, Owen Tyler, James F. Fairleigh, Alfred C. Krieger and Nicholas H. Dosker, all of Louisville, giving as the purpose of its organization the manufacture of steel buckets, steel pipes and similar products. The company will build and equip a plant in Louisville.

It is persistently rumored that the Kentucky Utilities Company contemplates the construction at Winchester of a large power plant, to cost in the neighborhood of $1,000,000, to furnish current to the company's plants in the surrounding towns, including Versailles, Shelbyville, Lawrenceburg, Somerset and Elizabethtown, besides the two cities mentioned, and to operate the electric lines already constructed and those planned. Color is lent to this report by the filing at Mt. Sterling recently of a trust deed covering the water and electric plants in Winchester, Mt. Sterling, Shelby-

ville, Versailles, Somerset and Elizabethtown, to the amount of $5,000,000.

The Continental Coal Corporation is said to have signed contracts for the supply of power to its mines near Middlesboro and Pineville, Ky., with a corporation, said to be H. M. Byllesby & Co., of Chicago, which will construct a $1,000,000 power plant in Bell County, Ky., for the purpose of furnishing light and power for the coal mines and towns in that vicinity.

The gas, water and ice plants at Barbourville, Ky., which have recently been consolidated under one management, will be extended by a $10,000 additional expenditure, which will be utilized in increasing the capacity of the ice plant, and in building additional water and gas lines.

W. N. Brown and J. W. Smith, Harrodsburg, Ky., are planning the construction of an ice and cold storage plant in that city, primarily for the purpose of handling produce and poultry.

At Maysville, Ky., W. Holton Key has purchased a site upon which he will erect and operate a tobacco factory.

The city of Bowling Green, Ky., is planning the establishment of a public abattoir, and Mayor Townsend, of that city, is having investigation made for the purpose of determining the best plan of construction and operation.

The Glasgow Electric Light & Power Company, Glasgow, Ky., has contracted with a New York firm for an entirely new plant, designed to supply the town with both day and night service.

The Louisville & Nashville Railroad Company, with general offices in Louisville, will erect and equip at Guthrie, Ky., a large creosoting plant, for the purpose of treating its own ties and other timbers. The plant will probably cost about $140,000, and considerable power and special machinery and equipment will be needed.

The Southern Veneer Mfg. Company, Louisville, will purchase for the purpose of edging its files in its own plant a grinder of the type used in the larger woodworking establishments.

The Louisville Water Company has completed the installation at its river pumping station of additional equipment which increases the capacity of the waterworks from 40,000,000 gal. to 70,000,000 gal. a day. The cost of the new equipment was about $75,000, including the pump, intake and turbine, the latter a 1500 k.w. Curtis machine furnished by the General Electric Company, with a rated speed of 1500 revolutions a minute.

The Wedgerite Chemical Company, Louisville, manufacturing a patented explosive designed for use in coal mines, by reason of the fact that it can be handled with safety, has started constructing a plant on a 20-acre site near Louisville, which will turn out five tons of the product a day.

The Faultless Caster Company, Evansville, Ind., is having constructed a new and modern factory building for its operations, with a ground floor space of 22,500 sq. ft. Clifford Shopbell & Co. are the architects.

J. W. Adams, Chattanooga, Tenn., has purchased from W. C. Houston, Nashville, Tenn., the electric light plant at South Pittsburg, Tenn. A 100-hp. engine and other equipment will be installed at once, and further improvements will be made later on. The new owner is also considering the construction of an electric railway between South Pittsburg and Richard City, Tenn.

The Walsh & Weidner Boiler Company, Chattanooga, Tenn., has sold to the interests represented by former Governor B. B. Comer, of Alabama, for use in the construction of a new cotton mill at Sylacauge, Ala., a power plant consisting of six 250-h.o. units. The same company has also sold boiler equipment to the Davis Hosiery Mills, Chattanooga, Tenn., and is constructing a similar horizontal tubular steel-incased boiler outfit for the new Grove Park Inn, at Asheville, N. C. This company recently shipped to its agent at Manilla, P. I., a consignment of four large internally-fired boilers for use in a sawmill near that city.

The Watauga Power Company, Elizabethtown, Tenn., has disposed of $300,000 of its bonds, the proceeds of which are to be used in extensions of its plant and the construction of transmission lines to furnish current to surrounding towns.

E. P. Anderson, E. J. Benedict, A. W. Fisher, G. P. Kinkle, A. M. King and D. B. Sweeney, of Memphis, Tenn., have organized the Sanitary Reversible Springs Company, with a capital stock of $25,000, and will build a plant in that city to manufacture bed springs.

The Universal Plow Company, recently organized at Florence, S. C., by J. A. Huggins and others, will establish a plant at that place, moving from Red Springs, N. C., the plow works which it purchased there.

The Williams Mfg. Company, Macon, Ga., manufacturing hay presses, lawn springs and log carts, has secured a site upon which it will erect a larger plant, the plans for which have not yet been detailed.

The East Carolina Lumber Company, recently incorporated at James City, N. C., will construct a mill at that place.

The plant of the Standard Stone & Brick Company, McClainsville, W. Va., was destroyed by fire last week, with a loss of about $100,000. The plant will probably be rebuilt.

St. Louis

ST. LOUIS, MO., December 9, 1912.

The machine tool market at this point continues to show improving tendencies and the inquiries are increasing, even though slowly, which was really to be expected at this time of the year. The tone of the market is more encouraging and dealers are of the impression that after the annual balance sheet and inventory period is passed there will be considerable activity in this territory. For the present, however, the business is chiefly on single tools, small replacements, etc.

The Rotary Washing Machine Company, St. Louis, has been incorporated with $50,000 capital stock, by Henry Brammer, A. Brammer and Charles W. Steele, to manufacture washing machines, household furniture and utensils.

The Peroxide Specialty Company, St. Louis, has increased its capital stock from $50,000 to $150,000 according to previously announced intention with a view to increasing its productive capacity.

Announcement has been made here of the intention of the Illinois Central Railroad Company to enlarge its shops, etc., at East St. Louis, together with its freight houses. The total expenditure is estimated at $500,000 and the number of employees to be added at 1000.

The Western Power and Light Company, Clayton, Mo., with capital not yet announced, has been organized by H. C. Garneau, F. R. Mott and Joseph Dickson, Jr., to build a plant to supply Clayton, Wellston and Ferguson with electric light and power.

The Formastat Mining Company, St. Louis, with $60,000 capital stock, has been incorporated by Arthur R. Deacon, Marion L. J. Lambert and Albert B. Lambert, to manufacture a special paint for coating steel and iron from mineral products being produced on mining land owned by them in Southeast Missouri.

Fire at St. Joseph, Mo., December 2, destroyed the plants of the American Sash & Door Company and the St. Joseph Specialty Shoe Machine Company, with a loss of $170,000. Plans for rebuilding are understood to be formulating.

The Manchester Iron Works, St. Louis, with $10,000 capital stock, has been incorporated by Gottfried Schmidt, Hugo L. Bofinger, John F. Wolfe and others to manufacture ornamental iron products and also to fabricate structural steel.

The H. S. Bachelor Mfg. Company, Kansas City, with $25,000 capital stock, has been incorporated by H. S. Bachelor, Maurice H. Winger and John Taylor, to do a general manufacturing business.

The Fisher Vehicle, Woodstock & Lumber Company, New Madrid, Mo., has been organized by E. H. and A. B. Fisher, C. J. Prince, David Mann and others to manufacture special parts.

An electric plant to replace the present equipment is to be installed by the Glasgow Electric Light & Power Company, Glasgow, Ky.

The Boltless Rail Joint Company, Oklahoma City, Okla., with $1,000,000 capital stock, has been organized by Rhea Lynn, R. E. Brittain and L. A. Brittain, for the manufacture of a new steam railroad rail joint.

Burrell J. Cramer, Charles J. Horn, Harry H. Phillips and Paul A. Neuffer, all of Chicago, Ill., have incorporated the Little Rock Gas & Fuel Company, at Little Rock, Ark., with a capital stock of $1,600,000.

A band saw mill with a daily capacity of 50,000 ft. is planned to be constructed at Pine Bluff, Ark., by J. F. McIntyre & Son.

The Iowa Grain Company, Oklahoma City, Okla., with $25,000 capital stock, has been incorporated by J. C. Pearson, of Marshall, Okla.; William Hayton, of Billings, Okla., and D. D. Cottrell, of Newkirk, Okla., to establish a grain elevator.

The planing mill of D. E. Gean, which was burned recently at Sheridan, Ark., will, it is reported, be rebuilt and re-equipped.

The Cassville Marble & Lime Company, Cassville, Mo., with a plant now under the direction of B. J.

Rosewater, has plans for the addition of considerable machinery, including new saws.

A plant for the manufacture of leather tires for automobiles is to be established at Oklahoma City, Okla., by Don O. Nation.

The Louisiana Casto Stone Company, Shreveport, La., with $30,000 capital stock, has been incorporated by W. E. Morris and S. W. Tullos, to equip a plant for the manufacture of cast stone for building and other purposes.

It is reported that the Carthage Metal & Milling Company, Carthage, Mo., will erect a 200-ton concentrating plant on a mine owned by it at Sarcoxie, Mo.

The Duenweg Lead & Zinc Company, Webb City, Mo., with $30,000 capital stock, has been incorporated by T. F. Lennan, Temple Chapman and G. T. Chapman to equip and operate mining land controlled by them.

The Nauvoo Canning Company, Nauvoo, Ill., has been incorporated with $25,000 capital stock by Fred Salm, Jr., Geo. W. Dachroth, John Laubersheimer and William M. Argast to equip a cannery.

The Arkansas Interurban Construction Company, Little Rock, Ark., which has been formed with a capital stock of $500,000, is reported to have the contract for the construction of an electric line from Little Rock to Hot Springs for the Little Rock & Hot Springs Electric Railway Company. W. H. Garanflo, L. Garrett, C. J. Kramer, O. D. Tucker, H. C. Couch and others are interested in both.

The Abigail Mining Company, Danville, Ky., has been incorporated with $40,000 capital stock by Mitchell Taylor, George P. Crow, John S. Van Winkle and T. S. Lanier, to operate a coal property near Danville.

The saw mill and cotton gin of Charles Craig at Black Oak, Ark., was burned last week with a loss of $6,500. It is understood that the plant will be replaced.

The roundhouse and shops of the Missouri, Oklahoma & Gulf Railway at Muskogee, Okla., recently burned with a loss of $40,000, will, it is reported, be replaced on a larger scale.

Birmingham

BIRMINGHAM, ALA., December 9, 1912.

Machinery dealers report a falling off in business, owing to the approach of the holidays. However, inquiries are still good and there is a fair volume going in all lines. Mines are regular takers of pumps, and new factories and contracting work continue to call for a variety of machinery. The fall business is pronounced as above usual, and the dealers look forward to much activity after the holidays. The situation is altogether satisfactory.

The plans for the plant of the National Cast Iron Pipe Company at Boyle's near Birmingham are nearing completion and work is to ensue on building the works in short order. Some machinery contracts have been let. A. H. Ford is president and E. E. Linthicum general manager.

Joseph H. Phillips and associates will install a water works on a large tract of land at Jacksonville, Fla., which they will develop.

W. P. Bullock, Kansas City, has been appointed consulting engineer for the city of Sarasota, Fla., in extending water works system, for which bonds were sold.

It is announced that Adler Brothers, of Birmingham, will expend $100,000 on a new mine opening at the Corona mines in Walker County. Modern machinery will be istalled.

R. H. Fleming, of Dawson, Ga., will establish bottling plant at Newnan, Ga.

W. A. Watson, of Erie, Pa., contemplates establishment of a pearl button factory at Decatur, Ala.

The North Jefferson Orchard & Canning Company, Empire, Ala., has been chartered with a capital stock of $5,000 to operate a cannery. O. R. Rowe is president.

The La Belle Canning Company will establish a cannery at La Belle, Fla.

Gerald Spafford, Belleville, Ont., Canada, and associates, are contemplating the erection of a large cannery at Miami, Fla.

W. S. Shure and associates will establish a cannery at Summerdale, Ala.

Lucas E. Moore Stave & Heading Company will soon begin the establishment of a plant at Mobile, Ala., for the manufacture of staves and heading for domestic and export trade. E. C. Grace is manager. A site for the plant has been leased.

The American Chemical Co., Toledo, O., will soon award contracts for a pine products plant, to be established at Valdosta, Ga. Much machinery will be purchased.

Joel Hurt, of Atlanta, has applied for permission to establish and operate a $150,000 electric power plant in connection with his new building on Edgewood avenue.

Angell Lumber Company, Macon, Ga., has been incorporated with a capital stock of $10,000, by Joseph Angell, C. M. Stubbs and F. W. Armstrong. It will establish a sawmill, etc.

The Columbia Oil Mills, whose plant at Columbia, Ala., was destroyed by fire some time ago, will rebuild, at a cost of about $50,000.

The Adams Machinery & Mfg. Company, Mobile, Ala., has been incorporated with a capital stock of $30,000, with W. J. Adams as president, L. G. Adams, secretary, treasurer and general manager, and Ashbel Hubbard, vice-president. The company will erect a plant for which it will need machine tools and metal working machinery.

Texas

AUSTIN, TEXAS, December 9, 1912.

The near approach of the holiday season is having some effect on the machinery and tool trade and dealers report a slight falling off in orders. It is expected that with the opening of the new year there will be a material increase in the demand for various lines of machinery. Encouraging reports of a material improvement in mining conditions in Arizona and New Mexico, as well as in Mexico, have reached here. Most of the mining camps in Mexico are rapidly resuming their former standard of production, and the installation of large amounts of machinery and the making of many improvements at the different properties are under consideration.

Calvin Arnett has purchased the site and will establish an iron foundry at Gainesville.

The Winchell Oil & Gas Company, which was recently organized at Brownwood with a capital stock of $60,000, is preparing to exploit that section for oil. The incorporators are Edwin T. Read, of Keller; B. M. McDonald and C. Andrews, of Fort Worth.

The City Council of Paris is having plans prepared for a municipal garbage crematory that will be installed there.

The County Gas Company, Dallas, has been organized with a capital stock of $100,000. It will construct a system of gas distributing mains through the city. The incorporators are C. W. Bertch, C. A. Caldwell and D. B. Taylor.

The Yoakum Machine Shop & Garage Company, Yoakum, which has been organized, will install a machine and repair shop. The incorporators are W. L. Orth, L. A. Orth, of Yoakum, and M. S. Orth, of Boston, Mass.

The City Council of Pecos has been petitioned by a number of taxpayers of that place to construct a sewer system there. Favorable action on the proposition will probably soon be taken.

The Sidney Smith Lumber Company, Fort Worth, is erecting a lumber mill near Carthage. It will have a daily capacity of 20,000 ft.

The Avis Smith Oil Company, Wichita Falls, has been organized for the purpose of operating in the oil fields of that section. The incorporators are T. B. Smith, J. D. Davis and W. C. Weeks, all of Wichita Falls.

The Galena Glove & Mitten Company, Galena, Ill., contemplates establishing a glove factory at El Paso, Texas. It has taken up the matter with the Chamber of Commerce of El Paso.

H. E. Atterberry and associates, Victoria, are arranging to establish a factory for the manufacture of stoves.

The Chamber of Commerce of San Angelo is negotiating with parties with a view of bringing about the establishment of a large broom factory.

W. W. Jones and J. C. Baldwin have purchased a site of 40 acres at Corpus Christi upon which they will erect a cotton-seed oil mill and cotton compress. The two plants will cost about $125,000, and it is planned to have them finished and ready for operation by the opening of the next cotton season. Bids for furnishing machinery for the plants will be opened at Corpus Christi January 1.

The City Council will submit to a vote of the taxpayers of Temple the proposition of issuing $75,000 of

bonds for constructing a sewer system and $75,000 of bonds for street paving.

The Brenham Gas Company has let the contract to J. M. Hide for the erection of the necessary buildings for the proposed gas manufacturing plant that is to be installed at Brenham. The cost of the plant and distributing system will be about $150,000.

The City Council of Uvalde has taken steps towards the construction of a sewer system there. Bonds will be issued for the purpose.

S. M. Peters, of Bremond, is organizing a company to develop coal fields near that place. Considerable machinery will be installed.

J. C. Dean and associates will erect a flour mill at Petersburg.

Morgan Hand, of Kansas City, Mo., who is connected with the General Electric Company, and C. C. Carroll are promoting the construction of an interurban electric railroad to run between Cloudcroft and Carlsbad, N. M., a distance of about 100 miles. The plans of the promoters contemplate the installation of a hydroelectric plant on the Penasco River to provide power for the operation of the line and also for the towns of the Cloudcroft section.

The Artesia Light & Power Company is preparing to install additional machinery and equipment at a cost of more than $300,000 at its plant at Artesia, N. M. It will construct electric transmission lines from its central power station at that place to farms of that section and furnish power for operating many pumping plants. The company is also developing on its own account several hundred acres of land upon which it is boring wells and installing motors and pumps. Among the machinery to be installed in the power plant are two 450-hp. Diesel engines. John C. Keys is president of the company.

A complete system of drainage and sewers is being constructed at Morelia, State of Michoacan, Mexico. Abel G. Nava has been appointed engineer in charge of the construction work by the Department of Fomento of the Federal Government.

Arrangements are being made by the Department of Fomento of the Federal Government of Mexico for the boring of a number of wells in search of artesian flows of water in different localities of the more arid portions of that country. It is planned to develop large supplies of artesian water upon the public lands of the country with a view of reclaiming same by means of irrigation. Wells will also be bored upon private lands with a view of encouraging their agricultural development.

The Pacific Coast

SAN FRANCISCO, CAL., December 3, 1912.

No machine tool business of any magnitude has appeared in the last fortnight, but the general situation is in some ways encouraging. Small business is keeping up remarkably well and dealers carrying large assortments of tools in store report a normal volume of sales, as contrasted with a period of several years up to last summer. Moreover, several projects are under consideration which may give rise to important purchases within the coming year. The tendency among local users of tools is to visit the Eastern markets in person before making large purchases, and one buyer is now on his way East for this purpose. Some Eastern concerns are making investigations with a view to installing large shops in this vicinity, though as yet their plans have not taken definite shape and their identity is not given out. All steel foundries and rolling mills in this vicnty are extremely busy, and iron foundries are well occupied, though prices on jobbing work are low.

The general machinery market is in unusually good shape for this season. A few good sized inquiries for woodworking equipment are coming out, and an active movement is expected during the winter repair season. Mines in California, Nevada and Arizona are buying freely, and many orders are coming from contractors on road and dam construction. Grading contracts have been let for the entire Exposition grounds, for which a lot of Koppel track and dump cars will be used, and additional harbor contracts will soon be let. Several large installations are being made for rock, cement and lime plants, and orders are coming out for the improvement or installation of ice plants at many points.

The California Foundry Company, Los Angeles, Cal., has been incorporated with a capital stock of $10,000 by A. Rudescher, J. G. and F. M. Webb.

The Archer Automatic Riveter Company, Chico, Cal., has been organized by W. J. Miller, W. A. Pearley, F. J. Nottelman, J. E. Archer and A. A. Smith for the purpose of manufacturing a patent riveting machine.

The C. L. Best Gas Traction Company, San Leandro, Cal., will put a new model engine of the caterpillar type on the market the first of the year. Two new grinding machines are now being installed at the plant.

The Inspiration Consolidated Copper Company, Miami, Ariz., has placed an order with the Orenstein-Arthur Koppel Company for prompt delivery of a lot of specially constructed cars of 42 cu. ft. capacity, 30-in. gauge.

The new converter of the Columbia Steel Company, Pittsburg, Cal., is now in operation.

The local shop of the Pelton Water Wheel Company is starting work on four 17,000-hp. units for the Drumm power house of the Pacific Gas & Electric Company. This is said to be the largest order ever placed for impulse wheels.

The Tonopah Extension Mining Company, Tonopah, Nev., is figuring on a 300-hp. electric hoist.

The Commonwealth Mining Company, Pierce, Ariz., is figuring on one 1055 and one 1400-hp. compressor and a 600 k.v.a. steam-electric generating unit.

Owners of the Davidson mine near El Dorado, Cal., are planning to add five stamps to the mill and install several concentrator tables.

The Fulton Engine Works and the Baker Iron Works, Los Angeles, have taken contracts for two gate towers on the Los Angeles aqueduct.

The San Diego, Cal., dredge contract has been let to the Union Iron Works, this city, at $22,400, for machinery, exclusive of motors and hull.

The Blue Ribbon Mfg. Company, Hanford, Cal., has been incorporated with a capital stock of $100,000 by L. Bruce, D. Murray, B. E. Zug, J. E. Meadows and S. F. Peterson, for the purpose of manufacturing gas engines, pumps and traction engines.

The Vanderslice Lumber Company proposes to install a large planing mill at San Diego, Cal.

The M. A. Burns Lumber Company, Castella, Cal., is planning to add a planing mill to its plant during the winter.

Canada

WINNIPEG, MAN., December 6, 1912.

The situation in machinery is practically unchanged, the volume of business being fair for the season, although not so active as a few weeks ago. Some good orders are being booked, and a few substantial prospects are in sight. The industrial outlook is very encouraging. It is expected that the spring will be brisk in this respect. Already plans are well advanced for quite a number of propositions that will involve the absorption of considerable machinery and supplies.

E. F. Hutchings, president, Great West Saddlery Company, Ltd., Winnipeg, controls a valuable site in this city on which a large 15-story office building is to be erected next summer. It is reported that Brown & Vallance, architects, Montreal and Winnipeg, will shortly prepare the plans for this building, which will cost about $1,000,000, and of which the principal owner is expected to be the Globe Securities, London, England.

The elevator of the Western Elevator Company, Ltd., Fort William, with a capacity of 1,000,000 bushels, is to be enlarged to a capacity of 2,000,000 bushels.

The Consolidated Elevator Company, Ltd., Winnipeg, has purchased a site in Fort William on which it will erect a terminal elevator with a capacity of 2,000,000 bushels.

John Taylor, president, Taylor Milling Company, Lethbridge, Alberta, announces that he will erect there a flour mill with a capacity of 3000 barrels, if the authorities of the city offer him similar inducements to those given to another milling company to build a mill of that size at Medicine Hat.

The Great West Brick & Coal Company, Ltd., capital stock $250,000, will establish a plant at Estevan, Saskatchewan, to manufacture pressed brick and other clay products. It has purchased the site.

F. A. Barton and C. F. Schaue, of Calgary, Alberta, are negotiating with the Council of Medicine Hat, Alberta, to erect a factory for making wrapping paper, straw board and kindred products. The plant proposed would cost $150,000.

The Canadian Pulp & Lumber Company, Ltd., Winnipeg, has been incorporated with a capital stock of $1,000,000, to carry on business as paper manufacturer and timber merchant.

The Western Canada Sheet Metal Products Company, Ltd., is being organized at Medicine Hat, Alberta,

to manufacture grain bins and wagon tanks. William Milner, of Casselton, North Dakota, is interested in the project.

The Northwest Brass Foundry Company, Ltd., Montreal and Winnipeg, as well as several points in the United States, has decided to establish a branch factory at Calgary, Alberta. It is said that the company will erect a plant at a cost of $300,000.

The city of Winnipeg has decided to increase the capacity of the municipal power plant at Point du Bois, Man.

The National Saw & Forge Company, Ottawa, Ont., has recently been incorporated with a capital stock of $500,000 to manufacture saws, planer knives, edge tools, bits, cutlery, drop forgings, firearms, electric and gasoline motors, etc., and to do a general foundry and machine shop business. Among the incorporators are Senator N. A. Belcourt, John A. Richie, Edgar R. E. Chevrier, Arthur W. Guertin and R. M. Bobier of Ottawa.

The Petrolia Motor Car Company, Petrolia, Ont., will build an extensive addition to its plant, plans for which are now being completed.

The Chapin Auto Cycle Company, Brantford, Ont., will erect and equip a factory, plans for which have been completed.

The Riordan Paper Mills at Merritton, on the Welland Canal, announces that it will build extensive new mills at Merritton next year to cost with equipment between $1,500,000 and $2,000,000.

Government Purchases

WASHINGTON, D. C., December 9, 1912.

The supervising architect, Treasury Department, Washington, will open bids January 14 for the mechanical equipment of the new building for the Bureau of Engraving and Printing at Washington. Separate bids will be taken for a hydraulic elevator plant, etc., for the same building.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids December 3 for material and supplies for the navy yards as follows:

Schedule 4937, class 21, for furnishing and installing necessary ice making machines, coolers, condensers, etc., on the United States battleship New York—Bidder 106, Kroschell Bros. Ice Machine Company, Chicago, Ill., $61,412; 138, National Contracting Company, New York, $40,998; 161, Railway and Stationery Refrigerating Company, New York, $149,116.80; 211, American Carbonic Machinery Company, Chicago, Ill., $62,500.

Schedule 4949, class 41, one patternmakers' disk grinder—Bidder 28, Charles H. Besly & Co., Chicago, Ill., $680; 121, Manning, Maxwell & Moore, New York, $679; 144, Oliver Machinery Company, New York, $330.

Schedule 4950, class 51, one feed pump—Bidder 4, James Corideo, Brooklyn, N. Y., $3,065, $2,565, $3,900 and $3,155; 49, D'Olier Centrifugal Pump & Machinery Company, Philadelphia, Pa., $5,448; 195, H. R. Worthington, New York, $4,875, $5,000 and $3,700; 207, Manistee Iron Works Company, Manistee, Mich., $3,800.

Schedule 4952, class 61, one 120-in. motor-driven crank-shaft lathe—Bidder 135, Niles-Bement-Pond Company, New York, $25,500.

Book Reviews

Forge Work. By William L. Ilgen, forging instructor, Crane Technical High School, Chicago, Ill. Cloth; size, 5 x 7¼ in.; pages, 210; illustrated. Published by American Book Company, New York. Price 80 cents, net.

This text book, which cannot fail to prove of value in schools where the art of forging is taught, was designed as a supplement to the instructor's oral teaching, as a reference in specific cases and as a syllabus for the teacher if needed as such. The numerous illustrations enable the student to form at once a mental picture of tools, appliances and methods that enter into forging, while ample description is given of practical exercises, insomuch as they are essential to skill. To each chapter are appended questions covering progress made. The concluding chapter is given to an elementary description of the manufacture of iron and steel, followed by formulas and tables. The book was revised editorially by Charles F. Moore, head of the mechanical department, Central Commercial and Manual Training High School, Newark, N. J.

Mechanical World Electrical Pocket Book for 1913. Pages 310, 4 x 6 in. Published by Emmott & Co., Ltd., 65 King street, Manchester, England. Price, sixpence net.

In presenting this new issue of the yearly revised electrical pocket book, it has been enlarged by the addition of 16 pages and the book generally has been thoroughly corrected and many new illustrations introduced. Some of the sections have also been rewritten and expanded, this in particular being the case with those dealing with dynamos and motors and with electrical measuring instruments. A new section on magnetic circuits and magnetic materials has been introduced together with one on load, demand, diversity and power factors. Other new sections deal with electric motor applications, motor control by switches, fuel in central stations, depreciation, etc.

Smoley's Parallel Tables of Logarithms and Squares. By Constantine Smoley, C. E., seventh edition revised and enlarged. Pages, 503, 4½ x 7 in. Published by the McGraw-Hill Book Company, 239 West Thirty-ninth street, New York City. Price $3.50 net.

In this edition a special device has been added for solving right triangles of comparatively small dimensions. This is a diagram that will enable the user with a little practice to obtain results which are accurate enough for all ordinary purposes almost at a glance. Where the results obtained from the diagram are not considered sufficiently accurate or analytic solutions are preferred, a general check on the results obtained can be secured by using the diagram. A table giving in parallel columns the logarithms and squares of numbers varying by sixty-fourths from 0 to 16 in., supplements the diagram. When very accurate results are required this table will be found convenient, and to facilitate reference the values corresponding to the odd sixty-fourths are in roman and the others in boldface type. With these exceptions, the book is the same as the previous edition, and in addition to the tables of squares in the first part contains tables of natural functions, squares, cubes, square and cube roots and reciprocals of all numbers from 1 to 1000 and tables of areas and circumferences of circles with diameters of from 1 to 1000.

Chemical Arithmetic and Calculation of Furnace Charges. By Regis Chauvenet. Pages XI + 302, 6 x 9½ in. Published by J. B. Lippincott Company, Philadelphia. Price $4.

As indicated in the title, this book is divided into two parts. The first, of 206 pages, is devoted to chemical arithmetic, and the methods of working out all kinds of chemical problems are carefully explained and illustrated by examples. The book has been written primarily for students in chemistry and technology and does not assume any previous knowledge on their part, but the metallurgist has also been kept in mind. The way in which the sections follow each other and the methods used show that the author has had much practical experience in teaching this subject; also that good common sense has been used as a basis for the work.

The second part applies the methods and principles above indicated to the calculation of furnace charges. The examples are mostly drawn from non-ferrous metallurgy, especially of copper, but there are several relating to the iron blast furnace. The author's use of simple simultaneous equations in solving these problems, which he calls the method of "representative equations," is excellent. This method, which greatly simplifies the work of calculating charges, is fully illustrated and probably constitutes the most valuable part of the book from the standpoint of the furnaceman and metallurgist. G. B. W.

Notes on Foundry Practice. By J. J. Morgan. Pages VI + 108, 5 x 7½ in.; illustrations, 24. Published by J. B. Lippincott Company, Philadelphia. Price $1.

This small book was written at the request of the English publishers, C. Griffin & Co., and admirably covers the field of English foundry practice in an elementary way. There is no need to outline in detail the various chapters, of which there are 20. According to the English tradition, fracture is taken as the basis for grading and mixing pig irons, although there is a short section on mixing by analysis. The chapter on molding sands, openers, binders and facings is very good. There is some room for criticism. For instance, the author makes no distinction between the English and American methods of making malleable cast iron, thereby leading his readers to suppose that they are the same. Also in his brief remarks on brass foundry work the use of oil fired furnaces for melting, which has become very important, is not mentioned. The book will be of interest to foundrymen, students and metallurgists who wish an elementary treatise dealing largely with English practice. G. B. W.